REPORT OF THE COMPTROLLER AND AUDITOR GENERAL OF INDIA : UNION GOVT. (COMMERCIAL), 1983 PART VII

HINDUSTAN PETROLEUM CORPORATION LTD.

ERRATA

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2	2.1.2	Notes (c) first line	Caltax	Caltex
5	3.3(d)	5th line (Audit Observations)	4.7.7	4.7.6
6	3.3(h)	9th & 10th line (Audit observations)	has been adproved	approved.
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20	5.11	2nd line 5th column of the table	cargoes	cargo
22	6.7.1	item (i) line 4	patern	pattern
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REPORT OF THE

COMPTROLLER AND AUDITOR GENERAL OF INDIA

UNION GOVERNMENT (COMMERCIAL)

1983

PART VII

HINDUSTAN PETROLEUM CORPORATION LIMITED

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PREFATORY REMARKS

A reference is invited to Paragraph 5 of the Prefatory Remarks contained in Part I of the Report of the Comptroller and Auditor General of India—Union Government (Commercial), 1983, wherein it was *inter alia* mentioned that the Report on the working of Hindustan Petroleum Corporation Limited, an undertaking selected for appraisal by the Audit Board, was under finalisation.

2. In this case, the Audit Board consisted of the following members :

1. Shri R. C. Suri . . . Chairman, Audit Board and Ex-officio Additional Deputy Comptroller & Auditor General (Commercial).

2. Smt. Saraswathi R. Rao . . Member, Audit Board and Ex-officio Director of Commercial Audit (Petroleum and Oil), Madras.

3. Shri M. K. Behl . . . Member, Audit Board and Ex-officio Director of Commercial Audit, Bombay.

4. Shri C. Abraham . . . Chairman-cum-Managing Director, Cochin Refineries Limited—Part-time Member.

5. Dr. I. B. Gulati . . . Director, Institute of Petroleum, Dehradun—Part-time Member.

3. The Report was finalised by the Audit Board after taking into account :

(*a*) The Comments furnished by the Ministry of Energy (Department of Petroleum) in December, 1983.

(*b*) The result of discussions held with the representatives of the Ministry of Energy (Department of Petroleum) and the Company on 12th January, 1984.

(*c*) The additional information furnished by the Company in January and February, 1984.

4. The Comptroller and Auditor General of India wishes to place on record his appreciation of the work done by the Audit Board and acknowledges with thanks the contribution, in particular, of the Part-time Members, who are not the officers of the Indian Audit and Accounts Department.

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LIST OF ABBREVIATIONS

AO	Axle Oil
APS	Atmospheric Pipestill
ARC	Administrative Reforms Commission
ATF	Aviation Turbine Fuel
BPSD	Barrels per streamday
BPT	Bombay Port Trust
BS & W	Base sediment and water
CBFS	Carbon Block feedstock
CDU	Crude distillation unit
COPE	Crude oil Price Equalisation
CS	Chemisperse
CTU	Crude Topping Unit
CRL	Cochin Refineries Limited
CORIL	Caltex Oil Refining (India) Limited
ESRC	Esso Standard Refining Company of India Ltd.
ESSO	Esso Eastern Inc.
FCCU	Fluid Catalytic Cracking Unit
FDZ	Free Delivery Zone
FO	Fuel Oil
FSP	Freight Surcharge Pool
GOI	Government of India
HHS	Hot Heavy Stock
HPC (HPCL)	Hindustan Petroleum Corporation Limited
HSD	High Speed Diesel Oil
HVI	High Viscosity Index
IFO	Industrial Fuel Oil
IL	Iranian Light
IOC	Indian Oil Corporation
JBO	Jute Batching Oil
KGC	Kosangas Company
LDO	Light Diesel Oil
LIL	Lube India Limited
LOBS	Lubricating Oil Base Stock
LPG	Liquified Petroleum Gas
LSHS	Low Sulphur Heavy Stock
LTS	Long Term Settlement
MS	Motor Spirit
MTO	Mineral Turpentine Oil
MTPA	Million Tonnes per Annum
NA	Not Available
OCC	Oil Coordination Committee
OIDB	Oil Industry Development Board
OPC	Oil Prices Committee
PEC	Profit Earning Capacity
RIDE	Reduction in Delivery Expenses
RPO	Rubber processing Oil
SBPS	Special Boiling Point Spirit
SKO	Superior Kerosene Oil
TEL	Tetra Ethyl Lead
TKD	Taluka Kerosene Depot
TOBS	Transformer Oil Base Stock
WGOP	Working Group on Oil Prices
VMU	Visakh Marketing Unit
VTS	Vacuum Tower Bottoms
VPS	Vacuum Pipe Still

1. *Introduction*

1.1 *Establishment of Refinery by ESSO at Bombay.*—The Government of India (GOI) through exchange of letters in 1951 & thereafter with ESSO Eastern Inc. (then known as Standard Vacuum Oil Company), a Corporation organised in the U.S.A., got the latter to agree to establish, construct & operate, in Bombay, an oil refinery to manufacture gasoline, Kerosene, diesel, fuel oil, asphalt and other petroleum products. Pursuant to this agreement ESSO constructed and started operating an Oil Refinery called "ESSO Standard Refining Company of India Limited" (ESRC), (Then called "Standard Vacuum Refining Company"), at Mahul, near Bombay by July 1954.

1.2 *Establishment of Lube Refinery by ESSO and Government of India at Bombay.*—By virtue of an agreement (Lube Refinery Agreement) between Government of India and ESSO in September 1965, a lube refinery called "Lube India Ltd." (LIL), with 50% of equity shares owned by Government and the other 50% by ESSO, was established in Bombay, in April 1966.

1.3 *Acquisition of shares in Oil and Lube Refineries by Government of India.*—As per participation Agreement between the President of India and ESSO, signed on the 14th March, 1974, Government purchased from ESSO, 74% of equity shares held by them in ESRC and an additional 24% of equity shares in LIL.

1.4 *Take-over of ESSO Marketing Undertakings by Government of India.*—By the ESSO (Acquisition of Undertakings in India) Act, 1974 (enacted on the 13th March 1974), Government of India acquired from ESSO, the ownership and control of their undertakings in India, carrying on the business of distribution and marketing of petroleum products manufactured by ESRC and LIL, so as to ensure a coordinated distribution and utilisation of these petroleum products. On the 14th March 1974, Government issued a notification vesting the taken-over marketing undertaking from ESSO, with ESRC, with effect from 15th March 1974.

1.5 *Merger of Lube Refinery with Oil Refinery and renaming as HPCL.*

1.5.1 By an order dated 12th July 1974, Government of India, transferred and vested LIL with ESRC, so that the production and marketing of Lube oils and other petroleum products may be carried on more efficiently and economically by a single company. Government also changed the name of the Company to "Hindustan Petroleum Corporation Limited" (HPCL) by the same order.

1.5.2 74% of the equity shares of HPCL were held by the Government and the remaining 26% by ESSO. As per the participation Agreement dated 14th March 1974 with ESSO, the Government acquired the remaining 26% also from ESSO, with effect from 30th September 1976, thus converting the HPCL into a fully owned Government Company.

1.6 *Take-over of Caltex Oil Refinery as well as Caltex Marketing Undertakings in India by Government of India.*—Government acquired the Caltex Oil Refinery (India) Ltd. (CORIL) at Visakhapatnam as well as Caltex (India) Ltd. which was marketing the products of CORIL, with effect from 30th December 1976 by an Act called "The Caltex [Acquisition of shares of Caltex Oil Refining (India) Limited and of the Undertakings in India of Caltex (India) Limited] Act, 1977" and merged the latter with the former. This merged Company (CORIL) was amalgamated with Hindustan Petroleum Corporation Limited with effect from 9th May 1978, so that the activities of both the Companies might be carried on more effectively and economically.

1.7 *Take-over of Kosangas Company.*—Kosangas Company, which was engaged in the bottling, transportation, marketing and distribution of LPG obtained from ESSO originally, and from HPCL later on, was also acquired by Government of India by the Kosangas Company (Acquisition of Undertakings) Act, 1979, enacted on 26th May 1979, and vested in HPCL by a notification issued on the same date. The owners of Kosangas Company, have challenged the provisions of the Acquisition Act and obtained a stay order from the Court, on 30th May 1979, in respect of taking over of Assets, other than gas business. The stay order still subsists (December 1983) and, therefore, HPCL have not taken over the other assets owned by the erstwhile Kosangas Company.

1.8 *Take-over of Management of two gas distributing Companies.*—Pending acquisition of the Undertakings of Parel Investment and Trading Private Limited and Domestic Gas Private Limited, which were also engaged in the business of bottling, transporting, marketing and distribution of LPG obtained from M/s. Caltex (India) Limited, the Government of India took over their management and appointed Hindustan Petroleum Corporation Limited as the Custodian of these two companies from 26th May 1979, for purposes of Management, on their behalf. The Act for taking over the Management has also been challenged by the owners in a Court of Law. These Companies have not yet been taken over by the Government (December 1983). Government stated

(January 1984) that since LPG Bottling Plants of these two Undertakings require modernisation for smooth and speedy operations to meet the increased demand for LPG from domestic consumers, HPCL has proposed to take over these Undertakings with effect from 26th May 1979 and further action will be taken on the receipt of Law Ministry's advice in the matter.

2. Capital Structure

2.1 *Cost of Acquisition of Foreign Companies.*—2.1.1 As mentioned in Chapter 1, Government of India subscribed to and purchased equity shares in LIL and ESRC. Subsequently, they acquired the marketing undertakings, in India, of ESSO and Caltex and also CORIL on payment of compensation. In September 1976, GOI also purchased the balance 26% of the equity shares of HPCL, which was originally allotted to ESSO on the amalgamation of LIL with ESRC in July 1974.

2.1.2 The consideration paid for each Undertaking acquired is compared below with the respective face and book value of the shares acquired by the Government of India.

Name of Undertaking	Mode & percentage (and date) of acquisition	Face value of the shares acquired	Book value of the shares acquired	Consideration
			(Rupees in lakhs)	
(*i*) Lube India Limited	Direct subscription 50% (April 1966)	240.00	240.00	240.00
	Purchase 24% (14th March 1974)	115.20	297.92 (As on 31st December 1973).	291.00
(*ii*) ESRC	Purchase 74% (14th March 1974)	166.50	1110.77 (As on 31st December 1973).	1529.00
(*iii*) Marketing Undertaking in India of ESSO	Take over 100% (13th March 1974)	(a)	169.29 (As on 13th March 1974)	259.00
(*iv*) HPCL	Purchase 26% (30th September 1976)	260.00	(b)	260.00
(*v*) Marketing Undertakings in India of Caltex.	Take over 100% (30th December 1976)	450.00	1755.50(c) (As on 31st December 1976).	1300.00
(*vi*) CORIL	Takeover 100% (30th December 1976)			

NOTES : (*a*) This undertaking was a unit of ESSO and hence there was no separate share capital for that.

(*b*) As no Balance Sheet was prepared by HPCL as on 30th September 1976, this figure is not given. Moreover, it was a purchase from ESSO at the face value, as originally agreed between GOI and ESSO in March 1974.

(*c*) Both CORIL and the Marketing Undertakings in India of Caltax, revalued their fixed assets as on 31st December 1974 and the net effect of revaluation (Rs. 1305 lakhs) as on 31st December 1975 was to increase the value of fixed assets, which was, however, written back on 31st December 1976 by CORIL (Government Company), without assigning any reasons for that. Both the Companies also revised the method of providing depreciation (*i.e.* from 'written down value' to 'Straightline' method) in the accounts for the year ended 31st December 1974, which resulted in writing back of depreciation to the extent of Rs. 714 lakhs by credit to the Profit and Loss Accounts.

2.1.3 When the matter of payment of compensation in excess of book value in respect of ESRC was brought to the notice of the Ministry, they stated as under (January 1984) :

> "It may be noted that ESSO made an offer in October 1972 that Government may consider taking over 74% of their equity shares in ESRC. The initial offer made by ESSO was Rs. 35.5 crores which was subsequently increased to Rs. 37.6 crores. Negotiations were held with ESSO by a Negotiating Committee of Secretaries based on guidelines given by the Cabinet Committee. The Cabinet Committee decided that "in making any counter offer there should be enough room for negotiations and, on this basis, the starting point should be computation of compensation as per book value. The ceiling would be compensation determined on the PEC basis." After detailed negotiations, the final price agreed to was Rs. 15.29 crores for 74% shares in ESRC, which was substantially lower than the market values insisted on by the owners and very much closer to the book value....."

2.1.4 While the acquisition of the marketing undertakings of ESSO was made for a consideration of Rs. 259 lakhs, that for the marketing undertakings of Caltex (I) Ltd. is not separately available. At this time, the Government-owned Indian Oil Corporation already had its own Marketing Division.

2.1.5 In the case of acquisition of Kosangas Company, the Act for Acquisition mentions a payment of an amount of Rs. 0.10 lakh for acquiring that Company free from all encumbrances. As on 26th May 1979 the date of take over of the Company, however, the liabilities exceeded the assets by Rs. 206.17 lakhs without taking into account assets valued at Rs. 14.07 lakhs, which were not handed over by the owners of Kosangas Company, and cylinders and regulators the assessed value of which was Rs. 163.87 lakhs. As mentioned in Chapter 1, the issue of acquisition is pending in the Court (December 1983).

2.2 Capital Structure

2.2.1 The subscribed and paid-up share capital of ESRC on 13th March 1974 was Rs. 300 lakhs, made up of equity share capital of Rs. 225 lakhs (11,25,000 shares of Rs. 20 each) and 6% cumulative redeemable preference share capital of Rs. 75 lakhs (75,000 shares of Rs. 100 each). On the amalgamation of LIL with ESRC and renaming of ESRC as HPCL, in July 1974, the subscribed and paid-up equity share capital was increased to Rs. 1000 lakhs (1,00,000 shares of Rs. 1,000 each, but the preference share capital remained the same *i.e.* Rs. 75 lakhs). The preference shares were redeemed during 1975. With the acquisition of the 26% equity shares held by ESSO in HPCL, in September 1976, HPCL became a fully owned Government Company. On the merger of CORIL and the marketing undertakings in India of Caltex with HPCL in May 1978, the paid-up equity share capital was increased to Rs. 1,520 lakhs (1,52,000 shares of Rs. 1,000 each), the authorised share capital being Rs. 2,075 lakhs (equity capital Rs. 2,000 lakhs and preference share capital Rs. 75 lakhs), which was increased by Rs. 2,500 lakhs by fresh subscription made by the Government in May 1983.

2.3 Shares allotted to Government by HPCL

2.3.1 In all, the Government of India invested Rs. 3,879 lakhs, in subscribing to, purchasing shares and acquiring the undertakings that were merged with HPCL upto May 1978. Government did not treat any part of this investment as a loan to HPCL. As directed by GOI, shares amounting to Rs. 1,520 lakhs were issued to Government by HPCL as tabulated below :

Name of the Undertaking	Mode and percentage of acquisition of shares by Government	Amount invested by Government	Allotment/Transfer of shares by HPCL to Government	
		(Rs. in lakhs)	Amount	Month of Allotment/transfer
(*i*) Lube India Limited	Direct subscription 50% Purchase 24%	240.00 291.00	573.50	July 1974
(*ii*) ESRC	Purchase 74%	1529.00	166.50	March 1974
(*iii*) Marketing Undertakings in India of ESSO	Take-over 100%	259.00	Nil	
(*iv*) HPCL	Purchase 26%	260.00	260.00	September 1976
(*v*) Marketing Undertakings in India of Caltex & CORIL.	Take over 100%	1300.00	520.00	May 1978
	TOTAL	3879.00	1520.00	

2.3.2 HPCL issued shares to Government for Rs. 1,520 lakhs only as directed by the Government and not for Rs. 3,879 lakhs invested by Government. This resulted in the Government not getting any return, by way of dividend, on the investment of Rs. 2,359 lakhs. HPCL had paid to the Government, a total dividend of Rs. 1,434.20 lakhs for the period from 1974 to 1982-83, which works out to an average of 13.20% per annum of the share capital actually held by the Government from time to time. However, on the total investment of Rs. 3,879 lakhs made by Government with effect from various dates, the return for the same period, works out to 4.74% per annum only.

2.3.3 As on 31st March 1983, HPCL had a total of reserves and surpluses, amounting to Rs. 11,335.42 lakhs, of which, Rs. 7,679.64 lakhs was the accumulated retained profits relating to the period from 1974 to 1982-83. When this matter was discussed with the Ministry on 12th January 1984, the Audit Board suggested that in other Government Companies where Capital Reserve etc. had been built up, bonus shares had been issued by these companies in favour of the Government. The Ministry agreed to get this proposal examined.

2.4 Long Term Borrowings

HPCL availed long term loans from Government of India, Oil Industry Pool Funds, Oil Industry Development Board and other sources. HPCL have also accepted deposits from the public for financing capital projects. Loans and deposits availed by HPCL, outstanding as on 31st March 1980, 1981, 1982 and 1983 amounted to Rs. 1,062 lakhs, Rs. 2,043 lakhs, Rs. 4,732 lakhs and Rs. 10,044 lakhs respectively. The debt equity ratio was 0.70:1, 1.34:1, 3.11:1 and 6.61:1 at the end of these years as compared to normal debt equity ratio of 2 : 1 for Public Sector Undertakings.

3. OBJECTIVES AND ACHIEVEMENTS

3.1 Need for Framing Objectives

The Committee on Public Undertakings and the Estimates Committees, in their reports, had recom-

mended that macro/micro objectives, both financial and economic, should be laid down for Public Enterprises and placed before the Parliament. The Administrative Reforms Commission (ARC), in their Report on Public Undertakings (October 1967), had also desired that GOI should make a comprehensive and clear statement on objectives and obligations of Public Enterprises. ARC had stated that the statement should lay down broad principles for determining precise financial and economic obligations of Public Enterprises in matters such as creation of various reserves, responsibility of self-financing, anticipated returns on capital employed, and basis for working out national wage and pricing policies. GOI considered these observations and spelt out broad objectives for the Public Sector, in their Industrial Policy Statement laid in the Lok Sabha in December 1977.

3.2 Objectives approved by Government and achievements thereof

3.2.1 GOI desired (June 1979) that HPCL should, without any further loss of time, spell out its micro objectives consistent with the broad objectives spelt out in the Industrial Policy Statement of December 1977, to facilitate realistic and meaningful evaluation by the Parliamentary Committee and GOI. The micro objectives and obligations of HPCL were approved by the Board in its meeting held on 20th December 1980. Government approved these objectives on 9th December 1983 after the COPU criticised the delay.

3.2.2 The objectives, as appproved by Government along with the observations against each are detailed below :

A. Objectives	Audit observations
1	2
(*a*) To serve the nation's vital interest in the oil and related matters. (*b*) To maintain continuity of supplies through their refining and marketing network at optimum costs and provide uptodate technical assistance to the consumer to conserve and put to the most efficient use this valuable energy resource.	General statement and hence no remarks.
(*c*) To achieve a reasonable return on investment.	During the year 1977-78 to 1982-83 the rate of return (before tax) on capital employed has been more than 15%, which was the rate recommended by the Oil Pricing Committee and accepted by Government in July 1975/December 1977. (Vide paragraph 7.3.1). But, in an administered price set up, as in petroleum industry, where costs are reimbursed by way of retention prices covering costs as fixed from time to time, and escalations in certain costs and other expenditure are also reimbursed, apart from 15% return on capital employed, allowed from the Oil Industry Pool Account, under its manifold heads of accounts, the profit margin achieved cannot be taken as any indication of the operational efficiency of the Company.
(*d*) To work towards achievement of self-reliance in the field of oil refining, formulations and distribution system. (*e*) To create a strong research and development base in the field of oil refining and stimulate research and development in developing new petroleum products so as to minimise their imports.	HPCL's refinery laboratories developed certain new products like rubber processing oil, axle oil for railways, etc. Beyond this, the laboratories are not equipped to undertake major R&D Proggrammes (Vide Paragraph 4.9).
(*f*) To maximise utilisation of the existing facilities in order to improve efficiency and increase productivity.	Kindly see remarks against item B(b) and (c) below.

B. Financial Objectives	Audit observations
(*a*) To ensure adequate return on the capital employed and maintain its annual dividend on its equity capital at a reasonable level.	Please refer to remarks against item A(c) above for return on capital employed. As regards annual dividends, HPCL declared dividends at 15% for 1974 and 1975. But, for the subsequent years *i.e.* from 1976 to 1982-83, the dividends declared ranged from 10% to 14% only and that too, on the equity capital which has been kept at Rs. 1,520 lakhs as compared to the actual payments totalling upto Rs. 3,879 lakhs made by Government for acquiring the shares and then the undertakings, now forming part of HPCL. (Vide para-paragraph 2.3.2.).
(*b*) To ensure optimum economy in expenditure. (*c*) To continue to make an effort in bringing a reduction in the cost of production of petroleum products manufactured by means of systematic cost control measures.	Cost reduction efforts by the Company are reflected in paragraphs 8.3.1. and 8.3.2. Increase in productivity and economy in expenditure in the following areas require more attention. (*i*) Despite execution of various energy conservation projects, there was no sustained reduction of the fuel and loss in the refineries, (Vide paragraph 4.4.1. and 4.4.2), which is attributed by the company to the crude mix made available to the Company which is heavier than the standard crude for the refinery.

1	2
	(*ii*) In spite of secondary processing facilities commissioned in the fuel refinery, Bombay, in January 1978, production of middle distillates could not be maintained at the higher level (Vide paragraphs 5.2.1 to 5.2.5). (*iii*) Crude throughput (and stream days) losses occurred in the refineries owing to breakdown of plants, partly attributable to deficiencies in the maintenance of plant and machinery. (Vide paragraphs 4.3.2, and 4.3.5), [HPCL stated (February 1984) that certain steps for improving the maintenance work have been taken]. (*iv*) Marketing expenses remained above OPC norms during 1980-81 to 1982-83.
(*d*) To generate sufficient internal resources for financing partly/wholly expenditure on new capital projects.	This has been achieved to a great extent as roughly half of the capital expenditure was met from internal sources during 1980-81 to 1982-83.
(*e*) To develop long term Corporate plan to provide adequate growth and activities of the Corporation.	HPCL have prepared a Corporate Plan for the years 1980-81 to 1984-85, and the Administrative Ministry feels that formal approval of this plan by the Administrative Ministry is not called for, as there are Government Directors on the Board of the Company.
(*f*) To endeavour to complete all planned projects within the stipulated time and within the stipulated cost estimate.	Instances of time and cost overruns in the implementation of projects have been pointed out in Chapter 5. How far this is due to inadequate utilisation of the Management Information System and how far inadequacy of manpower has contributed to this will be worth considering.

3.2.3 The obligations approved by Government include, *inter alia,* obligations towards customers, dealers, suppliers, employees and community. It was brought to the notice of the Ministry by the Audit Board (January 1984) that there is an urgent need for HPCL and all other Oil Companies to carry out educative programmes to inform the public about the hazardous effects of fuel and LPG use. The Ministry agreed with this view and mentioned that while action was being taken in this regard to educate the public further emphasis will be placed on this point.

3.3 Corporate Objectives and Achievements thereof

Based on the general objectives, HPCL formulated (September 1981) a Corporate Plan covering the period 1980-81 to 1984-85. The objectives spelt out therein for Refineries and Marketing and the achievements thereof are detailed below:

Objectives	Audit Observations
(*i*) *Refineries*	
(*a*) Improve and update the plant hardwares to realise better productivity and efficiency, and larger turnaround intervals. (*b*) Replacement of inefficient and old equipment that has already reached retiring limit with new ones of improved design and performance rating. (*c*) Incorporate facilities in the Refinery to provide flexibility for processing local and imported crudes.	A crude desalter to reduce the salt content of crude charged to furnace was added at a cost of Rs. 43 lakhs at Visakh Refinery in November 1980. A number of other projects, like replacement of furnaces and boilers in the refineries, addition to crude desalter at Bombay refinery, heat exchangers at both Bombay and Visakh refineries and waste heat boiler at Visakh refinery and expansion of Bombay and Visakh refineries for a total estimated cost of Rs. 32,590 lakhs are under implementation (December 1983). Turnaround took place at Fuel and Lube refineries at Bombay in 1977 in April/May 1980 and in April/May 1982. In Visakh Refinery, turnaround was done unitwise during 1978-79, 1979-80, 1981-82 and 1982-83 with consequent idling of C.T.U. during planned shut downs of COU (Vide para 4.5.7).
(*d*) Modernise instrumentation to realise better and improved product recovery.	HPCL have stated that this is being done on a continuing basis, but the audit observations in paras 4.4.1, 4.4.2 and 4.7.4. to 4.7.7. are relevant.
(*e*) Application of total energy concept for optimisation of heat and power requirements, improving energy conservation not only on heat recovery but others like power consumption.	The efforts relating to this have been dealt with in paragraphs 4.8.1. to 4.8.4.
(*f*) Application of modern operations research techniques, including computer usage, for efficiency improvement like planned maintenance, metal inspection system, engineering computations, process control, material and energy balance etc. (Computer applications like monitoring of Project implementation, refinery turnaround PERT etc. are already in vogue in HPCL).	HPCL stated (January 1983) that they have developed a programme to evaluate crude preheat exchanger performance at Visakh Refinery and optimisation study to determine choice of location of bottling plants based on demand and supply of LPG in addition to computerisation of project implementation and refinery turnaround programmes; beneficial effects thereof are yet to be achieved as regards

Objectives	Audit Observations
	avoidance of time overruns in project implementation and reduction of turnaround and intervals/ duration, etc. which are attributed to delays in the supply of equipment by the vendors and other factors. HPCL is stated to be meeting the pollution standards.
(*g*) Improve on air and liquid effluents quality, although HPCL refineries now meet all the pollution standards set by ISI.	However, a project taken up at an estimated cost of Rs. 608 lakhs in November 1979 to reduce sulphur-dioxide (a pollutant) emission at the refinery in Bombay and to recover elemental sulphur from Hydrogen sulphide streams is expected to be completed by March 1984 only.
(*h*) Augmentation of production capacities of current product lines and diversification to other products not manufactured hitherto.	Some of the projects mentioned against (a), (b) and (c) above will meet this objective. In addition, a project to increase production of hexane, a raw material required in the extraction of edible oil, at a cost of Rs. 561 lakhs, has been approved by Government in October 1982 is under implementation (February 1984).
(*i*) Intensive training programmes/refresher courses for refinery personnel. To keep abreast of latest technological advances in petroleum technology, personnel may be sent abroad to attend seminars/courses, if necessary.	HPCL have stated (January 1983) that training programme for engineers at the Indian Institute of Petroleum are being arranged and that they have plans to enter into an agreement with M/s. Universal Oil Products, USA, for information on refinery technology, and seek the expertise of overseas specialists to explore areas of potential energy conservation and pollution at the fuel refinery Bombay.
(*ii*) *Marketing*	
(*a*) To achieve a level of sales consistent with the Sales Plan entitlements.	Achieved.
(*b*) To maintain marketing expense per unit of sales within the allowable OPC levels.	Marketing expenses (mainly delivery expenses not revised by OCC) were more than OPC norms during 1980-81 to 1982-83.
(*c*) To keep stock loss at a minimum.	Actual stock losses (percentages) have not exceeded budgeted losses during 1981-82 and 1982-83.
(*d*) To provide a high standard of service to the consuming public.	Kindly see paragraphs 6.4.1 & 6.4.2 where steps taken, with an analysis of shortfall, have been briefly indicated.
(*e*) To make optimum use of the investments in storage, transpostation and marketing outlets.	No comments.
(*f*) To ensure discipline in marketing in terms of quality, quantity and price to the consumer.	No comments.
(*g*) To promote conservation of petroleum products through research and development activities.	Please see remarks against item A(e) of paragraph 3.2.2.
(*h*) To ensure equitable distribution of petroleum products in all areas of the country.	Kindly see paragraph 6.3.2.

4. PRODUCTION PERFORMANCE

4.1 Installed capacity

HPCL has two fuel refineries, one at Bombay and the other at Visakhapatnam. The refinery at Bombay was established in July 1954 by ESRC and that at Visakhapatnam in April 1957, by CORIL. These came under HPCL from March 1974 and May 1978 respectively. The installed capacity of these two refineries at the end of March 1983 was 5.1 MTPA (Bombay 3.5 and Visakh 1.6). HPCL also has a lube refinery at Bombay, established in December 1969, by LIL, which was taken over by GOI in March 1974, and entrusted to HPCL. This refinery receives reduced crude from the fuel refinery at Bombay as feed stock. The installed capacity is 0.184 MTPA (lubricating Oil Base stock 0.164 lakh tonne ; Axle Oil : 0.10 lakh tonne and Rubber Processing Oil : 0.10 lakh tonne).

4.2 Design feed of Units and actual stream efficiency

4.2.1 The design feed capacity of each unit of the Fuel Refinery Bombay, Visakh Refinery and Lube Refinery made available by the Management is given below :

(*a*) *Fuel Refinery, Bombay*

Atmospheric pipe still (APS).	70,000 Barrels per Calendar Day.
Vaccum pipestill (VPS) (Commissioned in January 1978).	10,000 Barrels per stream day (BPSD).
Cat cracking	6,500 BPSD increased to 9,000 BPSD on commissioning Cat Debottling unit in January 1978.
Cracked LPG Propane Asphalt Oxidiser.	1,650 BPSD of cracked Naptha 800 BPSD of Virgin LPG 3210 BPSD.

(*b*) *Visakh Refinery*

		Capacity in BPSD*
(*i*) APS	Stream crude	14000
(*ii*) VPS	Reduced crude	8100
(*iii*) Crude Topping Unit (CTU).	Crude	7000
(*iv*) Propane Decarbonisation Unit.	Vac. rasiduo	3000
(*v*) Fluid catalytic cracking Unit (FCCU).	FCCU feed	8400

*Based on processing Maines/Arabian Light/Iranian Light (IL) crudes.

	Barrels per Stream Day (BPSD)
(c) *Lube Refinery*	
VPS	21,130
Phenelfiner :	
150 — N	3,280
500 — N	4,820
1300 — N	3390,
Industrial Oil Hydrofiner	
IO — 100	1,850
IO — 500	1,850
IO — 1600	1,850
Propane Dewaxing	
150 — N	3,100
500 — N	4,190
1300 — N	3,890
IO — 100	4,190
IO — 1600	3,610
Hydrogen Plant	Virgin LPG 236.5 Kg/Hr.

4.2.2 When audit raised the point regarding Review of actual feed in each unit *vis-a-vis* the designed and inpupt-output relationship not having been made, HPCL stated (June 1981) :

> "When plants are operated at design parameters, achievable capacity would be close to design due to precision in the original design. However, actual throughputs would be different from design throughputs when plants operate at conditions different from those conceived in the design parameters."

4.2.3 They further stated (November 1981) "The design of H.P. Bombay Refinery is based on advanced technology. The entire complex is highly integrated where the various processes required for refining of crude petroleum and making finished products are integrated into one single complex. Hence the material balance for each individual process cannot be made on segregated basis."

4.2.4 As each unit has a designed input, it is necessary to monitor the actual input as also the output from each unit and compare that with the variations that would arise on account of the type and quantity of crude used and products achievable therefrom so as to check the efficiency of working of each unit and to take corrective steps whenever necessary.

4.2.5 The Ministry, to whom the matter was referred, stated (January 1984) as under :

> "It is expected that internally the Company would set norms and targets for the performance of various processing units and keep monitoring the actual performance *vis-a-vis* these targets and norms. The company will be asked now to ensure that appropriate norms are set". During the meeting of the Audit Board (January 1984), the Company and the Ministry agreed to have the input/output of major units monitored with a view to evaluate their stream efficiency.

4.3 Throughput Capacity Utilisation

(a) *Fuel Rfinery, Bombay*

4.3.1 The table below gives the installed capacity of the fuel refinery at Bombay, targets fixed by the HPCL upto 1978-79 and by the Oil-Coordination Committee (OCC) thereafter, with reference to availability of crude, as also the actual crude throughput during 1975 to 1982-83.

(In million tonnes)

Year	Installed capacity	Target	Actual crude throughput	Crude throughput (loss) with reference to Col. (2)	Crude throughput (loss) with reference to Col. (3)	Percentage utilisation with reference to Col. (2)	Percentage utilisation with reference to Col. (3)
1975	3.500	2.880	2.723	(0.777)	(0.157)	77.8	94.5
1976	3.500	3.190	2.820	(0.680)	(0.370)	80.6	88.4
1977–78 (15 months prorated to 12 months)	3.500	2.880	2.936	(0.564)	0.056	83.9	101.9
1978–79	3.500	3.246	2.799	(0.701)	(0.447)	80.0	86.2
1979–80	3.500	3.401	3.133	(0.367)	(0.268)	89.5	92.1
1980–81	3.500	3.267	3.115	(0.385)	(0.152)	89.0	95.3
1981–82	3.500	3.533	3.485	(0.015)	(0.048)	99.6	98.6
1982–83	3.500	3.052	3.125	(0.375)	0.073	89.3	102.4

NOTES : (*a*) The capacity that could be worked before January 1978, *i.e.* till the commissioning of VPS and Cat Depot Project, was limited to 2.750 MTPA, which was the secondary processing capacity (cracker capacity) for achieving optimum yields of distillates till then.

(*b*) The capacity that could be worked in the turnaround years of 1980–81 and 1982–83 was 3.200 MTPA.

4.3.2 Reasons for crude throughput loss for 1975 to 1977-78 have not been made available. For subsequent years, reasons indicated by HPCL, apart from those which were outside the control of the company, included the following :

Year	Reasons	Crude throughput (loss) tonnes in lakhs
1978–79	(*i*) Emergency shutdown of pipestill in May, July and August 1978.	4.64
	(*ii*) Damages to furnaces caused by abnormal quantity of water in crude cargo.	0.54
1979–80	(*iii*) High base sediment and water (BS&W) in crude.	1.28
1980–81	(*iv*) Delay in start up of VPS	0.84
1981–82	(*v*) Plant Emergency	0.59
	(*vi*) Silt problem	0.33
1982–83	(*vii*) Plant Emergency	1.16
	(*viii*) Loss due to extended FCCU shutdown.	0.12

4.3.3 Emergency shutdown of pipestill in May 1978 was due to development of cracks in the shell which was attributed (September 1978) by experts who went into the causes, to hydrogen sulphide stress erosion during shutdown and start up and not during normal operations of the refinery. Repairs were carried out at a cost of Rs. 14.95 lakhs. The Expert Committee report pointed out, *inter alia*, (i) possibility of water in feeds, slugs (ii) likelyhood of underbead cracking during welding of shells, (iii) existence of internal material defects, (iv) non-clearing of corrosive product by Sand/grit blasting which could have caused the cracking.

(b) *Visakh Refinery*

4.3.4 The table below gives the installed capacity of the Visakh Refinery, targets fixed by HPCL and actual crude throughput during 9th May, 1978 to 1982-83 :

(In million Tonnes)

Year	Installed capacity	Target	Actual crude throughput	Crude throughput gain/ loss with reference to		Percentage utilisation with reference to	
				Col. (2)	Col. (3)	Col. (2)	Col. (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
9-5-78 to 31-3-79	1.433*	1.249	1.196	(0.237)	(0.053)	83.5	95.8
1979–80	1.600	1.355	1.100	(0.500)	(0.255)	68.8	81.2
1980–81	1.600	1.262	1.319	(0.281)	0.057	82.4	104.5
1981–82	1.600	1.125	1.178	(0.422)	0.053	73.6	104.7
1982–83	1.600	1.146	1.077	(0.523)	(0.069)	67.3	94.0

*Installed capacity of 1.6 million tonnes per annum pro-rated for 327 days.

NOTE : The Management stated that based on the types of crudes made available and yield optimisations required, the installed capacity came down to 1.500 MT during 1979–80 & 1980–81 and 1.400 MT during 1981–82 and 1982–83.

4.3.5 Reasons for crude throughput loss indicated by HPCL apart from those which were outside the control of the company included the following :

Year	Reasons	(Tonnes in lakhs)
9-5-78 to 31-3-79	(*i*) Emergency shutdowns	0.16
1979–80	(*ii*) Additional turnaround and Inspection shutdown.	1.09
	(*iii*) Other plant contingencies	0.62
1980–81	(*iv*) On scheduled shutdown of crude distillation unit (CDU)/CTU for boiler stack replacement and hooking up of desalter.	0.27
	(*v*) Other plant contingencies	0.48
1981–82	(*vi*) Plant problems	0.39
	(*vii*) Higher planned shutdowns than allowed in target.	0.08
1982–83	(*viii*) Plant problems	0.75
	(*ix*) Lower feed rates at FCCU	0.19
	(*x*) CTU shutdown for furnace repairs in May 1982.	0.30
	(*xi*) CDU/CTU Emergency shutdown in October 1982.	0.04

4.3.6 The production loss in respect of Fuel refinery and Visakh refinery resulted in under-recovery of fixed overheads amounting to Rs. 384.40 lakhs to the company.

(c) *Lube Refinery*

4.3.7 The table below gives the installed capacity targets and actual production of the Lube Refinery, during 1975 to 1982-83.

(In Million Tonnes)

Year	Installed capacity	Target	Actual production	(Shortfall)/gain with reference to		Percentage utilisation	
				Col. (2)	Col. (3)	Col. (2)	Col (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1975	0.184	0.180	0.163	(0.021)	(0.017)	88.6	90.6
1976	0.184	0.200	0.179	(0.005)	(0.021)	97.3	89.5
1977–78 (15 months prorated to 12 months)	0.184	0.180	0.177	(0.007)	(0.003)	96.2	98.3
1978–79	0.184	0.187	0.192	0.008	0.005	104.3	102.7
1979–80	0.184	0.200	0.203	0.019	0.003	110.3	101.5
1980–81	0.184	0.184	0.180	(0.004)	(0.004)	97.8	97.8
1981–82	0.184	0.153	0.166	(0.18)	0.013	90.2	108.5
1982–83	0.184	0.175	0.147	(0.037)	(0.028)	79.9	84.0

4.3.8 The reasons for shortfall against targets are given below :

Shortfall during 1975 to 1977-78 was attributed by Management (September 1982) to lower demands for axle oil and Rubber Processing Oil. Shortfall of 43,000 tonnes (value Rs. 90.23 lakhs) during 1980-81 was due to ullage in November/December 1980 restricting throughput in Propane Dewaxing Unit and lower availability/allocation of crude by OCC in January 1981 with consequent reduction in reduced crude feed to Lube-VPS. Shortfall of 27,900 tonnes (value Rs. 690.50 lakhs) in 1982-83 was on account of lower demand for TOBS and delay in start up of P.D. unit.

4.3.9 The production during 1978-79 and 1979-80 in excess of the designed capacity was mainly due to increased production of neutral base oil (90,000 tonnes in 1978-79 and 1,08,000 tonnes in 1979-80 compared to the design of 77,000 tonnes) rendered possible due to processing of Basra Crude with less wax content.

4.3.10 Regarding the targets set for the fuel refineries, particularly in regard to Fuel Refinery at Bombay, Ministry stated (January 1984) as under :

"The Target for crude throughput for each year is set considering the planned maintenance shutdown, if any, during that year and provision for various emergencies/contingencies such as emergency unit breakdowns, crude supply slippages, Industrial relations problems, even natural calamities etc. such contigencies have indeed been faced in real life. An allowance of 10%, contingency factor has usually been made in the case of HPC Bombay Refinery".

They further stated "there could also be variation due to the actual crude processed compared to crude mix assumed for setting the achievable targets".

4.3.11 During discussion with the Ministry (January 1984) the Audit Board pointed out that it would be advisable if standard/norm were developed towards capacity utilisation keeping in view of the major crude being purchased by the Company which would also facilitate setting up of realistic targets and also to quantify at more acceptable percentage for the contingency factor. The Ministry stated that these factors will be under constant review and the para-meters would be suitably refixed as and when found necessary.

4.4 **Fuel and Loss**

4.4.1 The percentage of actual fuel and loss in respect of the two fuel refineries are compared below with the norms fixed by OPC for standard pattern of production :

	Percentage to crude throughput			
	Fuel Refinery Bombay (including Lube Refinery)		Visakh Refinery	
	OPC norms	Actuals	OPC norms	Actuals
1977–78	6.69	6.01	—	—
1978–79	6.69	6.34	8.30	8.6
1979–80	6.69	6.33	8.30	8.57
1980–81	6.27	5.85	8.30	7.34
1981–82	6.27	6.10	8.30	8.10
1982–83	6.27	6.41	8.30	8.82

4.4.2 The fuel and loss has exceeded the OPC norm in 1979-80 (Visakh Refinery) and in 1982-83 (both the refineries). This is inspite of the various energy conservation projects executed (vide paras 4.8.1. to 4.8.3). This was attributed (January 1983) by the Company to change in crude mix and variations in product-mix, changes in FCCU yields due to changes in catalysts and operating conditions, running the

crude distillation unit at lower feed rate due to tanker delays, and frequent power failure resulting in higher consumption. The Ministry stated (January 1984) that there was a continuous technical audit and data generated will be looked into by an Industry Group outside the company, like the OCC, to refix the norms taking into account the conditions of the refineries.

4.5 **Plant Performance**

(a) *Fuel Refinery, Bombay*

4.5.1 Crude pipestill, Cat cracking unit and VPS are the main units. The last mentioned Unit was commissioned in January 1978.

4.5.2 Norms for stream efficiency for each unit had not been fixed. In January 1983, HPCL indicated the norms for stream days as 336 for turnaround years and 358 days for APS, 350 days for VPS and FCCU for non-turnaround years. However, HPCL did not indicate any norms for measuring the input/output of even major units (*Vide* para 4.2.4. and 4.2.5).

4.5.3 The targets of stream days fixed for each year by the company differ from the norms for stream days now indicated above as may be seen from the table below, which compares these targets with actuals.

Year	Light ends/propane/solvent crude pipestill			Vacuum Pipestill			Cat Unit/cracked LPG		
	Target	Actual	Excess/ (shortfall)	Target	Actual	Excess/ (shortfall)	Target	Actual	Excess/ (shortfal
1975		342						324	
1976.		363						337	
1977–78(15 months prorated to 12 months)	340	342	2				328	338	10
1978–79	365	313	(52)	350	242	(108)	350	361	11
1979–80	336	356	20	321	306	(15)	321	356	35
1980–81	330	333	3	315	267	(48)	312	321	9
1981–82	330	363	33	315	349	34	315	363	48
1982–83	330	331	1	315	302	(13)	315	297	(18)

NOTE : No targets for 1975 and 1976 were fixed.

4.5.4 Main reasons for excess downtime during 1978-79 to 1982-83 are :

1978-79—(i) Crude pipe still was down for 48 days due to cracks/leaks and for 4 days due to lower crude availability caused by work to rule agitation by BPT flotilla crew and low crude stock position.

(ii) VPS was down due to non-availability of feedstock on account of crude pipestill shutdown and due to lower crude rate arising out of tanker slippage/BPT and Merchant Navy strike and high BS & W.

1979-80.—VPS was down due to lower crude throughput arising out of tanker slippage, BPT strike and High Bottoms, Sediment and Water (B.S. & W) content in crude.

1980-81—VPS was down due to—

(i) major modifications to tower, needed for post-Lube Refinery Expansion Operations, carried out during turnaround resulting in 24 days' delay on account of change in erection plans, and

(ii) lower crude throughput in anticipation of lower crude availability due to tanker Iraq conflict.

1982-83.—VPS :

(i) Lower crude throughput on account of lower crude availability due to tanker delay.

(ii) Tube leaks in furnace; replacement of 16 tubes.

Cat Unit :

Excess downtime is due to inspection of the unit to take measures to reduce high cat loss.

4.5.5 Excess in actual stream days can, apparently, be due to fixing the targets too low.

(b) *Visakh Refinery*

4.5.6 CDU, CTU and FCCU are the main units. Norms if any, for stream days in a year were not made available in spite of the specific request made by the Audit Board in October 1982. Table below gives available actual stream days and downtime days during the period 9-5-1978 to 1982-83 :—

Year	Available stream days	CDU		CTU		FCCU	
		Actual stream days	Down-time days	Actual stream days	Down-time days	Actual stream days	Down-time days
1978–79 (9-5-78 to 31-3-79)	327	320	7	291	36	301	26
1979–80	366	312	54	291	75	307	50
1980–81	365	358	7	330	35	331	34
1981–82	365	333	32	320	45	295	70
1982–83	365	318	47	287	78	353	12

4.5.7 Reasons for downtime are :

1978-79.—The Units were down due to non-planned emergency shutdown.

1979-80.—(i) CDU was down due to planned and non-planned/emergency shutdowns and low crude inventory for 54 days and CTU for 76 days consequent on planned shutdown of CDU not coinciding with that of CTU.

(ii) FCCU was under emergency shutdown for 32 days. The unit was also idle for a further period of 26 days on account of Battery Shutdown and for repairs to Main Salt Water Header.

1980-81.—(i) CDU and CTU were down for 7 days due to nonplanned/emergency shutdown and low crude inventory.

(ii) FCCU was down for 25 days due to non-planned/emergency shutdowns and for 9 days on account of idling due to power outage and stream limitations. The Company stated (January 1983) that the existing boilers which have outlived their life are being replaced by two boilers of higher fuel efficiency.

1981-82.—(i) CDU was under planned shutdown for 32 days. Apart from non-planned emergency shutdowns, CTU was idling for 32 days due to planned shutdown of CDU not coinciding with that of CTU.

(ii) FCCU was down due to planned shutdown.

1982-83.—(i) CDU/CTU was under planned and emergency shutdowns.

(ii) FCCU was under planned shutdown.

(c) *Lube Refinery*

4.5.8 VPS, Phenol Finer, Propane Dewaxing, Industrial Hydrofiner and Hydrogen plant are the main units.

4.5.9 No norms have been fixed for stream efficiency for each unit but during the discussion with the Audit Board in January 1984, the company and the Ministry agreed to have the input/output of major units monitored with a view to evaluate their efficiency.

4.5.10 In January 1983, HPCL indicated that the norm for stream days for VPS is 330 for a turnaround year and 350 for a non-turnaround year and in the cases of Phenol finer unit, Industrial Hydrofiner, Propane Dewaxing unit and Hydrogen Plant, the norms are 305, 302, 295 and 307 respectively for both turnaround and non-turnaround years. Table below give targeted and actual operating days during 1975 to 1982-83.

Year	Vacuum pipe-still			Phenol finer			Propane dewaxing			Industrial ydrofiner			Hydrogen		
	Target	Actual	Excess/ short-fall	Target	Actual	Excess/ short-fall	Target	Actual	Excess/ short-fall	Target	Actual	Excess/ short-fall	Target	Actual	Excess/ short-fall
1975		312			310			292			244			284	
1976		336			349			326			230			354	
1977–78 (15 months prorated to 12 months)	330	324	(6)	328	315	(13)	327	307	(20)	299	269	(30)	312	319	7
1978–79	349	314	(35)	347	316	(31)	303	299	(4)	328	273	(55)	347	292	(55)
1979–80	321	347	26	325	366	41	287	339	52	292	260	(32)	325	348	(23)
1980–81	314	295	(19)	325	286	(39)	310	271	(39)	222	261	39	325	292	(33)
1981–82	315	339	24	320	356	36	300	332	32	222	185	(37)	320	347	27
1982–83	315	303	(12)	308	305	(3)	277	241	(36)	179	201	22	308	269	(39)

NOTE : No targets were fixed for 1975 and 1976.

4.5.11 Reasons for excess downtime during 1977-78 to 1982-83 are :—

1977-78—All units were down due to emergency breakdown, repairs to flare stack and low demand of industrial oils.

1978-79—Non-availability of reduced crude because of emergency shutdown of Atmospheric Pipe Still of fuel Refinery and low demand of industrial oils.

1979-80.—Low demand of Industrial Oils.

1980-81.—(a) Lower crude availability/allocation by OCC.

(b) Extended turnaround consequent on Industrial Problems after turnaround and non-availability of Hydrogen & feedstock.

1981-82.—Low demand of Industrial Oil.

1982-83.—*Vaccum pipestill* : Power outage and low crude availability.

Phenol finer : Power outage.

Propane Dewaxing : Extensive work involved/modifications for IRE tie-ins.

Hydrobgen Plant : Power/Electrical failure, tube leaks.

4.6 *Consumption of Chemicals and Utilities*

4.6.1 No design norms per tonne of feed stock have been fixed for consumption of chemicals and utilities in the Fuel Refinery and Visakh Refinery. Audit suggested (October 1982) fixing of norms for individual units based on actual working and to compare such norms with actual performance. HPCL made available (January 1983) norms since evolved for consumption of chemicals for fuel Refinery, as also electricity and water for fuel refinery and Lube Refinery at Bombay. These norms were not evolved after study and trial run under optimum conditions but based purely on historicals, *i.e.*, average of actual consumption during 1975 to 1980-81. Norms on a Scientific basis are yet to be evolved. (December 1983).

4.6.2 Actual consumption of chemicals in various process units is also not separately recorded. HPCL stated (November 1981) "Design norms cannot be related to crude throughput and are not proratable to variations in Crude throughput. Our refinery was commissioned in 1954 with a capacity of 25 MB/CD, and thereafter, it has gone through a number of modifications and current capacity is about 70 MB/CD, with vastly different product mix and complexities compared to the original design. As a result, no design norms were formally established."

4.6.3 Consumption of chemicals in the Fuel and Visakh Refinery have been compared with budgeted norms during 1975 to 1982-83 in Annexure I and II.

4.6.4 From the Annexure I and II it would be seen that the excess consumption in cases of some of the chemicals amounted to Rs. 261.14 lakhs. Reasons for excess consumption are :

(*a*) *Fuel Refinery, Bombay*		
1975 & 1976		Not available.
1979–80	Oleum	(*i*) Increase in aromatic content of before-treat hexane (2.0 Vs. 1.8 Vol.) because of increased production of hexane distillate.
1980–81, 1981–82, 1982–83	Catalyst	The Company's efforts to locate the causes for increase in catalyst consumption have not met with success (December 1983) and efforts are being continued as stated by the Company.
1980–81, 1981–82	Oleum	Increase in production of treated Hexane (20.4 Vs. 5.1 MT).
	Caustic	Mainly due to higher production of treated Hexane.
	TEL	Lower octane of LCN due to low severity operation.
1982–83	Oleum	Higher treated Hexane make (17.1 Vs. 15.0 MT).
	Caustic	Mainly due to : (*i*) (*a*) Caustic unsaturation of ATF reactor after turnaround. (*b*) Processing of Arab Light and Arab Extra Light crudes (12.4 T and 25.9 T respectively) with high B/T RSH. (*c*) Back pressure problem causing inadequate/excess air injection in November 1982 to February 1983. (*ii*) Higher production of Hexane.
	TEL	MS–83 maximisation coupled with lower LCN availability due to Cat Unit problems.
(*b*) *Visakh Refinery*		
1978–79 and 1979–80	Catalyst	Changes in quality required for unit make up to maintain revised standard pattern and price escalation.
1980–81	TEL	Higher MS production.
	Catalyst	Increased release through regeneration stack from April 1980 to March 1981 and change in Catalyst type.
	Sulphuric acid	Processing Light Iranian crude which was not assumed in original budget.
1981–82	Sulphuric acid	Due to processing of IL Crude which was not assumed in Budget Targets.
1982–83	TEL	(*i*) Due to changes in crude mix compared to Budget (lesser BH processing) and excess conversion of LAN to MS 83R resulted in higher usage of TEL. (*ii*) *Catalyst :* Lesser consumption due to usage of equilibrium catalyst. (*iii*) *Sulphuric acid :* No comments. (*iv*) *Caustic soda and other chemicals :* Excess consumption due to trial runs and start-up of D.M. plant in October 1982 and its subsequent commissioning and running.

4.6.5 During the discussion of the appraisal by the Audit Board with the Ministry in January 1984, the latter agreed to the need for laying down scientific norms for chemicals and catalysts.

(c) *Lube Refinery*

4.6.6 Consumption of chemicals in Lube Refinery compared to design norms are, generally, well within the norms.

4.7 *Consumption of Utilities*

4.7.1 Norms for consumption of utilities like water and electricity have also not been prescribed. Actual consumption of utilities in various units is also not separately recorded. Budget norms only as mentioned in paragraph 4.6.3 are fixed every year for utilities also. HPCL stated in this connection (June 1981) :

> "The design philosophy has been to monitor consumption of utilities on an overall basis since it was evaluating consumption, unitwise. Also, such facilities will be highly expensive and will need high investment for maintenance also. Experience has shown that overall control of the utilities is adequate for management information and monitoring purposes."

4.7.2 Annexure III gives, in physical terms, consumption of electricity and water per tonne of crude throughput.

4.7.3 Total quantity of steam/compressed air generated and utilised in various units is not available to assess the extent of variations utilisation vis-a-vis total production. HPCL stated (June 1981) that steam/air are generated within the refinery to meet plant requirements and that any abnormal rise in consumption of utilities will cause corresponding increase in consumption of water/fuel/electricity, which are being closely monitored. HPCL further stated (November 1981) "except for major consumers such as reboilers, strippens, and towers, other consumers are not measured by meters. It is not our practice to prepare monthly steam balance as it is not required for operational needs. However, surveys are conducted when warranted, to identify areas of leaks and corrective action taken."

4.7.4 HPCL made available (September 1982) report on steam survey made on 15th February 1978 to establish a steam production/consumption balance and identify possible areas of reducing steam consumption. According to this report, a large portion of the total consumption was unaccounted and could be due to higher than estimated consumption in unmetered areas and steam leaks. The report also made certain suggestions such as installation of flow indicator on major consumers, activisation of existing FR on Propane reboiler and FI on Propane Stripper, minimise steam loss through leaks, replacement of turbine, driven pumps by motor driven pumps and reducing consumption in certain areas.

4.7.5 The Company stated (January and March 1983) that steam leak surveys and repairs are regular activities in the Bombay refinery; and are attended to by technical engineers and mechanical crew respectively; new meters have been installed and mostly commissioned as recommended in the Survey Report of February 1978 and that the other recommendations have been incorporated in the day to day refinery operations to the extent permissible and subject to prevailing operating constraints. As against steam leaks of 10,000 lbs./hours reported in the survey report of February 1978, the steam leaks was 3,000 lbs/hours as per the next survey, which was conducted in November 1982.

4.7.6 No other survey report relating to the interim period from March 1978 to October 1982 was made available. Consumption of electricity increased since 1978-79 and consumption of water also went up in 1978-79 and 1979-80 as compared to 1977-78 vide Annexure III. Inspite of the Company's statement vide para 4.7.3 supra, that such steam surveys are conducted when warranted, they were not undertaken in spite of the increase in consumption of utilities during these four and half years.

4.7.7 In Visakh Refinery, the quantity of steam consumed during 1980-81 was 5.12 lakhs tonnes. The Company stated (January 1983) that based on available data, the estimated steam consumption for 1978-79 and 1979-80 was 4.87 lakh tonnes and 4.81 lakh tonnes respectively. Reasons for not recording the actual steam consumption prior to 1980-81 and information on the system of effective monitoring of fuel consumption called for in October 1982 were not made available (December 1983).

4.8 *Energy Conservation and Energy Audit*

4.8.1 The Company has an energy conservation cell in the refinery to monitor energy conservation measures through operating improvements and investments in capital projects, broadly covering the following areas :

(1) combustion efficiency monitoring ;

(2) Preheat monitoring ;

(3) Utilities consumption (Steam, air etc. monitoring) ; and

(4) Manufacturing loss monitoring.

4.8.2 The Company also executed 6 capital works for energy conservation at a cost of Rs. 5.50 lakhs in the Fuel Refinery Bombay during 1975 to 1979 and 12 capital works, at a cost of Rs. 51.07 lakhs, in Visakh Refinery, during 1975-76 to 1981-82. The estimated savings in fuel oil consumption on account of these completed projects was 4697 tonnes and 2768 tonnes per annum respectively. However, during 1982-83, the fuel and loss increased over OPC norms in both the Refinery.

4.8.3 The Company has also on hand, 19 capital works at an estimated cost of Rs. 1,686.06 lakhs which are expected to result in a saving of 22,048 tonnes of refinery fuel per annum.

4.8.4 The Company stated (March 1983) that conventional energy audit approach that would require segregation of energy inputs and consumption per Unit/per product/per equipment basis and as per forms of energy, could not be implemented in operating their refineries in the absence of extensive monitoring meteres/instruments and due to complexity of refinery operations. To bring in a comprehensive outlook for energy audit, the Company is proposing (December 1983) to initiate action in the form of overall refinery energy balance.

4.9 During the meeting with the Ministry (January 1984) Audit Board mentioned that there was effectively no Research and Development effort evident with the Company. There was near absence of Research and Development Policy and Programmes and the directions in which this effort was required, was not clear. It was also mentioned that though there was Research and Development programme for Oil in the Sixth Plan, not much substantial work was done. The Oil Companies need to have, besides the Industry Research and Development Centre, Strong Research and Development base devoted to process improvement debottlenecking, product improvement, cost reduction, etc.

The Secretary of the Ministry agreed with the observations of the Audit Board and indicated that like in the Steel Ministry, it would be imperative that in addition to a strong Central Research and Development unit, each unit develops its own indigenous R & D unit. The Secretary further emphasised that only if Units have strong Research and Development Organisations, they will be able to have benefit for the knowledge available with the main Research and Development Centre.

5. EXPANSION AND MODIFICATION SCHEMES

5.1 Schemes Completed/Under Execution

The following are some of the main projects completed/under execution as expansion and modification schemes :

(Rs. in lakhs)

Name of the Project	Original cost	Revised cost	Actual expenditure in respect of projects completed/Expr. upto March '83 in respect of projects under execution	Date of completion	
				Original	Actual
(1)	(2)	(3)	(4)	(5)	(6)
1. Vacuum pipe-still and Catalytic Cracker Debottlenecking Project.	430	470	463	November 1976	December 1977
2. Aviation Turbine Fuel Pipeline from Refineries in Mahul to Santa Cruz Airport.	104	190	185	December 1979	March 1981
3. Mandatory Crude *Tanks ot* Bombay and Visakh *Phase IA :*					
Bombay	763	778	797	January 1978	June'78 and March'79
Visakh	209	217	217	August 1979	October 1980
Phase IB	561	—	379	June'83 (Bombay) & Nov. '83 (Visakh)	Under progress
Phase II	1273	—	617	December '83 (Bombay) & April '84 (Visakh)	Under progress
4. *Marketing of LPG :* Phase I	3044	4323	4040	April 1980 to October 1980	In phases upto 1983–84
Phase II	2393	2836	1836	March 1983	In phases upto 1983–84
5. Lube Refinery expansion	1320	1646	1622	June 1981	February 1983
6. Bombay-Pune Product Pipeline	2117	5442	1498	August 1984	
7. Sulphur Recovery Project	270	608	124	May 1982	Under progress
8. Crude Oil discharge pipeline, Visakh.	890	1336	29	April 1984	
9. Bombay Refinery expansion	3840	4507	669	April 1985	
10. Visakh Refinery expansion Project.	6585	15036	5551	December 1984	
11. Crude desalter, Bombay	85	160	144	April 1982 revised to November 1983	Under progress
12. Hexane maximisation	561	—	Nil	October 1985	
13. Additional product tankage, Phase I	1001	1128	205	1984–85	

5.2 Vacuum pipepstill and Catalytic Cracker Debottlenacking project

5.2.1 Vacuum pipestill and Catalytic Cracker Debottlenecking for the fuel refinery at Bombay was proposed in 1974 for providing additional secondary processing capacity at the refinery for increasing the production of LPG and Naphtha as also the production of Middle Distillates like kerosene and Diesels etc. at the expense of less valuable heavy ends.

5.2.2 The project, approved by GOI on 20th May 1975 and scheduled to be completed in November 1976, was actually completed in December 1977 and commissioned in January 1978 only, due to delay in delivery of gas compressor and blower by foreign vendors and delay in delivery of switch gear and other equipments by local vendors. Due to delay in completion of the project, the Government of India had to import products like FO and kerosene from rupee sources as well as from free foreign exchange sources. The Company stated (January 1983) that it is difficult to quantify the exact financial implication due to the delay in completion of the above project.

5.2.3 The project was executed for improving the secondary processing capacity so as to maintain the same level of distillate yields as obtained from a crude throughput of 2.75 MTPA earlier for a higher throughput of 3.5 MTPA which is the installed capacity of the refinery. The percentages of middle distillates and heavy ends obtained to the total throughput of crude during 1975 to 1982-83 are given below :

Year	Percentage of	
	Distillates obtained	Heavy ends obtained
1975	62.4	31.6
1976	64.1	30.0
1977–78 (15 months)	66.3	27.6
1978–79	66.2	27.5
1979–80	67.4	26.2
1980–81	67.5	26.6
1981–82	62.1	31.8
1982–83	60.5	33.1

5.2.4 While the distillate yield rose from 62.4% to 66.3% by 1977-78 (i.e. before the impact of this project) it went up only marginally from that level to 67.5% by 1980-81 and came down considerably in 1981-82 and 1982-83. The Company attributed (October 1983) this to heavier Arab crudes such as 65/35 mix and 60/40 mix processed during these years instead of the traditional 80/20 mix.

5.2.5 In view of the fact that unit-wise outputs are not ascertainable, only a technical evaluation will show whether the drop in distillate yields is attributable entirely to the heavy crude only or it was partly due to operational deficiencies too. During the meeting of the Audit Board with the Ministry on 12th January 1984, the latter stated that OCC was constantly reviewing the crude availability to evolve the best crude slate and product mix keeping in view the increased utilisation of indigenous crude.

5.3 Aviation Turbine Fuel Pipeline from Refineries in Mahul to Santa Cruz Airport

5.3.1 Construction of an 18 km. long (8 inch diameter) pipeline for transporting ATF from HPC/BPC refineries at Mahul to Santa Cruz Airport so as to avoid carriage of ATF by tank lorries and to provide more economic mode of transportation, was approved (June 1978) by Government of India at a cost of Rs. 104 lakhs, which was revised to Rs. 190 lakhs (April 1980). The increase in cost was mainly due to change in the scope of the project, general price rise in material and labour cost. The Project, scheduled for completion in December 1979, was mechanically completed in March 1981 and came into operation in June 1981 after completing pre-commissioning activities. The slippage in the schedule of commissioning was on account of delays :

(i) in delivery of pipes by Hindustan Steel,

(ii) finalising orders for pipeline, and

(iii) in actual laying of the pipeline, as it had to pass through crowded city area.

5.3.2 With the commissioning of the pipeline in June 1981, transportation of ATF by tank lorries was stopped and diverted through the pipeline. The savings in transportation cost by tank lorries envisaged in the project report is Rs. 27.47 lakhs for transport of 5 lakhs M.T. per annum. On this basis, the savings in the transportation cost foregone from January 1980 to May 1981 due to delay in completion and commissioning of the project was about Rs. 39 lakhs.

5.3.3 The company stated (December 1983) that even after commissioning of the pipeline, it was not possible for HPCL/BPCL to pump more than 5,000 to 6,000 tonnes per month through this pipeline upto November 1981 due to delay in commissioning of storage tanks at Santa Cruz by IOC to receive the product and even if HPCL had completed the project as per schedule, it would not have been possible to pump more than 20% of the expected consumption through the pipeline upto November 1981.

5.3.4 As such, the savings foregone by HPCL is apparently not just Rs. 39 lakhs but approximately Rs. 52 lakhs.

5.4 Marketing of LPG

(i) *Phase I*

5.4.1 The feasibility report, envisaging an outlay of Rs. 58.15 crores for marketing of LPG from Bombay High associated gas, prepared jointly by HPCL and BPCL in July 1977 was approved (October 1978) by GOI. The project envisaged establishment of infrastructural facilities for marketing of 1,68,000 MTPA (84,000 MTPA each by HPCL and BPCL) of LPG. The share of cost between HPCL and BPCL was Rs. 30.44 crores and Rs. 27.71 crores respectively. The project relating to HPCL envisaged construction of new filling plants and storage facilities at Bombay, Bangalore and Nagpur besides transporta-

tion eqipment HPCL's cost of the project was revised to Rs. 38.88 crores mainly to meet escalation in cost of filling plants and storage (Rs. 4.70 crores), cylinders and regulators (Rs. 3.16 crores), transport equipment (Rs. 0.58 crore). This was approved (August 1981) by GOI. The cost is anticipated (January 1983) to increase to Rs. 43.23 crores on account of further increase in cost of filling plants (Rs. 0.80 crore), cylinders and regulators (Rs. 3.55 crores, mainly due to import of more expensive regulators and valves). Expenditure incurred to end of March 1983 was Rs. 40.40 crores.

5.4.2 The following table gives the schedule/ actual completion of filling plants at Bombay, Bangalore and Nagpur.

	Schedule of completion	Actual completion
Bombay Bottling Plant	April 1980	November 1980
Bangalore . . .	October 1980	June 1981
Nagpur	October 1980	August 1981

The reasons for delay in completion were :—

(i) staggered deliveries of conveyor system ;

(ii) strike at vendor's plant for fabricating spheres ;

(iii) long delivery time quoted by compressor vendors and further delay in actual delivery ; and

(iv) prolonged delivery periods quoted by vendors for several items.

5.4.3 The installed capacity of LPG filling plants at Bombay, Bangalore and Nagpur as per project report was 25,000 MT per year. Although the plants were commissioned in November 1980, June 1981 and August 1981 respectively, LPG filling plant at Bombay was running on single shift basis till August 1982 and Bangalore and Nagpur LPG filling plants are still running on single shift basis. The installed capacity based on single shift and its utilisation during the years 1980-81 and 1981-82 and shortfall in production plantwise was as under :

Year	Installed capacity based on single/ double shift M.Ts.	Actual filling M.Ts.	Shortfall M.Ts.	Percentage of under utilisation of plant capacity
1	2	3	4	5
(1) *Bombay*				
1980–81 . . (from Nov. 80 to March 81)	8085	2908	5177	64.03
1981–82 . .	21168	11824	9344	44.14
1982–83 . .	21168	20806	362	1.71
(2) *Bangalore*				
1981–82 . . (from July '81 to March '82) .	6750* (Pro rated for 9 months)	4302	2448	36.27
1982–83 . .	9000	8751	249	2.76
(3) *Nagpur*				
1981–82 . . (from Aug. '81 to March '82). .	5250* (Pro rated for 8 months)	3348	1902	36.59
1982–83 . .	9000	8983	17	0.18

*The installed capacity is 18000 MTPA as intimated (January 1983) by the Corporation for filling cylinders fitted with M.B. Valves. This is equivalent to 25,000 MTPA for compact valve cylinders.

5.4.4 The Ministry stated (January 1984) as under :—

> "At the outset, we wish to advise that these bottling plants have been designed for optimum capacity each of 25,000 MTPA, depending on the terminal volumes in 1984/85 in the markets that are to be fed ex-these points. Hence some under utilisation will exist during the initial years of operation."

LPG availability itself during the years 1981 and 1982/83 was such that the Oil Industry had to resort to LPG imports from abroad to augment the indigenous supplies to keep the markets continuously fed with product. By and large, all the LPG production in the country, together with the import have been absorbed in these years. The above is amplified by the statement hereunder :

	LPG Supply Demand			('000 tonnes)	
	Production			LPG Sales	
	HPC Bom./ Visakh	Industry Total	LPG Imports	HPC	Industry Total
1981/82 . .	101.7	484.1	11.156	125.9	492.4
1982/83 . .	74.0	576.0	49.29	150.1	601.9

From the above statement, it will be noticed that the bottling capacity has been utilised commensurate with LPG availability. Because of problems of logistics, the imported product was consumed at locations closer to the source of imports viz. Bombay.

During the period February 1981 to March 1982, HPC was able to enrol only 2.34 lakh customers against the target of 3 lakhs customers set up for the period. The lower enrolment was due to restricted supply of MB valves click type regulators by the indigenous manufacturer. HPC has been able to achieve enrolment objectives during 1982/83.

The performance of these bottling plants has quickly improved during 1982-83, and in the first 6 months of 1983-84, commensurate with increased availability of LPG. The Ministry's reply would indicate that the under-utilisation of the LPG bottling plants was, primarily, due to shortage of LPG perse.

(ii) *Phase II*

5.4.5 The project envisages installation, at Hyderabad, of one more LPG bottling plant of a

capacity of 25,000 tonnes per annum, expansion of the capacity of the LPG bottling plant at Indore from 4,000 to 25,000 tonnes per annum and construction of a manual plant at Vijayawada. The Project, estimated to cost Rs. 23.93 crores, including foreign exchange component of Rs. 4.08 crores, was approved (March 1981) by GOI. The plants at Hyderabad, Indore and Vijayawada were originally scheduled to be completed by March 1983. The completion schedule was revised to June 1983 in respect of the plants at Hyderabad and Indore. The plant at Vijayawada was partially commissioned in March 1982. Due to delay in delivery of critical equipment like compressors by vendors, the other two plants are now expected to be partially commissioned in March 1984 with road-fed bulk supplies, as completion of railway siding is anticipated to be delayed. Expenditure incurred to end of March 1983 was Rs. 18.36 crores.

5.5 Lube Refinery Expansion

5.5.1 Anticipating shortfall in the availability of High Viscosity Index (HVI) lube base stocks from 1980-81 and considering the fact that manufacturing them indigenously was far more economical than importing the same, HPCL proposed (1975) to expand its Lube Refinery, at an estimated cost of Rs. 9.95 crores, including foreign exchange component of Rs. 1.09 crores, GOI accorded approval in June 1978.

5.5.2 The total cost of the project estimated in June 1978 (at 1977 prices) as Rs. 13.2 crores, including foreign exchange component of Rs. 2.5 crores. This was revised in May 1980 (at 1979 prices) to Rs. 14.30 crores, with a foreign exchange component of Rs. 3.20 crores. The final cost of the project, as estimated in April 1983, was Rs. 16 crores. The increase in cost was attributed mainly to escalation in prices. Expenditure incurred to end of March 1983 was Rs. 16.22 crores.

5.5.3 On completion of expansion, the refinery was expected to produce additional 74,000 tonnage of HVI lube base stock per annum and yield 5,000 tonnes of TOBS and 50,000 tonnage of CBFS. Completion of the project originally scheduled by June 1981 was revised to second quarter of 1982-83. The project was actually completed in February 1983 and after trial runs, production commenced in April 1983.

The slippage in the schedule of completion was due to delay in :

(i) delivery of imported critical equipment like filter and compressor,

(ii) delivery of indigenous equipments like furnaces, towers and drums by M/S Vijaya Tank and Vessels due to labour and financial problems of the vendor, and

(iii) delivery of reactors exchanges and drums by Richardson & Cruddas.

5.5.4 The cost of import of HVI Lube base stocks, however, during the period June 1981 to March 1983 was Rs. 94.74 lakhs.

5.6 Bombay-Pune Product Pipeline

5.6.1 In October 1975, HPC submitted to GOI a feasibility report for construction of a pipeline (16 inch diameter and 168 km. long) from the refineries at Bombay to Pune, for transportation of Petroleum products. The cost of the project was estimated at Rs. 22 crores. Pending approval of Government, HPC incurred, during 1975 and 1976, an expenditure of Rs. 9.21 lakhs on survey, feasibility report etc. In view of the plan of the Railways for a third ghat-line, this scheme was not taken up and the expenditure incurred was written off in January 1978.

5.6.2 However, the proposal was revived and HPCL submitted (July 1979) a fresh feasibility report. This project envisages installation of a petroleum products pipeline from Bombay Refinery to Pune (151 km.) to transport MS/HSD/KERO/LDO to cater to the demand in Pune and supply zones fed therefrom. The cost of the project, estimated at Rs. 21.17 crores including foreign exchange component of Rs. 72 lakhs, was approved (February 1981) by GOI. The scheduled date of completion is August 1984. The cost of the project is anticipated to increase to Rs. 54.42 crores as per revised feasibility report submitted to Government (June 1983). The revision in cost was necessitated due to :—

(i) escalation in cost since May 1979.

(ii) increase in length of pipeline (151 km. to 158 km.), on account of change in location of the terminal.

(iii) increase in the size of the pipeline diameter (12 to 14 inches) to meet the growing demand of the petroleum products of Pune region not anticipated earlier.

5.6.3 Expenditure incurred to end of March 1983 is Rs. 1,498 lakhs, against a total estimated outlay of Rs. 5,442 lakhs.

5.7 Sulphur Recovery Project

5.7.1 A project for recovery of elemental sulphur from Hydrogen Sulphide rich streams of Bombay Refinery to reduce Sulphur Di-oxide emission, estimated to cost Rs. 2.7 crores, including foreign exchange component of Rs. 60 lakhs, was approved (November 1979) by GOI. The revised cost submitted (June 1981) to GOI is Rs. 4.4 crores including a foreign exchange component of Rs. 65 lakhs, on the basis of then existing cost. The cost was further revised (December 1982) to Rs. 6.08 crores at September 1982 prices. The reasons for the increase of Rs. 3.38 crores over the cost estimates approved in November 1979 are :

(i) cost escalation (Rs. 1.16 crores),

(ii) changes in detailed engineering (Rs. 1.03 crores),

(iii) under-estimation (Rs. 0.42 crore),

(iv) increase in consultant's scope of work (Rs. 0.46 crore),

(v) pre-production interest (Rs. 20 crores), and

(vi) contingencies (Rs. 0.11 crore).

5.7.2 The project, taken up for pollution control and originally scheduled for completion in May 1982 is now expected to be completed by 1983-84. The reasons for the slippage are on account of delay in :

(i) finalisation of agreement with foreign licensor,

(ii) difficulties encountered in obtaining quotations for air blowers, and

(iii) revision of specifications for reactor by process licensors.

5.7.3 The project is in progress (December 1983) and the expenditure incurred to end of March 1983 was Rs. 124 lakhs.

5.8 Crude Oil Discharge Pipeline—Visakh

5.8.1 The project envisages installation of a pipeline over a length of 9.2 km. both off-shore and on-shore, for transportation of crude directly to the refinery from outer harbour, thereby effecting an estimated freight savings of Rs. 20 crores on the transportation of crude of 4.5 MT per annum. The cost of the project, estimated at Rs. 890 lakhs including foreign exchange component of Rs. 94 lakhs was approved (November 1982) by GOI. The project was scheduled for completion in April 1984. The proposed pipeline is linked with the outer harbour project of Visakh Port. HPCL had awarded contracts for laying of on-shore pipeline in April 1983 and off-shore pipeline in August 1983.

5.8.2 The revised cost estimate of Rs. 13.36 crores (due to increase in dredging quantities and general price escalation) with foreign equipment component of Rs. 5.24 crores has been approved by the Board in November 1983.

5.8.3 The expenditure incurred on the project upto 31st December 1983 amounted to Rs. 186 lakhs.

5.9 Bombay Refinery Expansion

To augment the Bombay High Crude processing in the country, installation of facilities for processing 2 MTPA of BH crude at Bombay Refinery of HPCL was considered by HPCL and a feasibility report (October 1981) envisaging an outlay of Rs. 38.4 crores, including foreign exchange component of Rs. 8.3 crores, was submitted to Government of India. The project was approved (October 1982) by GOI for Rs. 45.07 crores, including Rs. 10.02 crores toward foreign exchange component. The project envisages installation of primary crude processing facilities, namely crude distillation unit, utilities and the attendant offsites for refining. The project is scheduled for completion by April 1985. The implementation of the project has been taken up and expenditure incurred on the project upto March 1983 was Rs. 6.69 crores.

5.10 Visakh Refinery Expansion Project

5.10.1 The Project envisages expansion of crude processing capacity from 1.6 to 4.5 MTPA with a new grassroot Fluid Catalytic Cracking Unit of 0.6 MTPA fresh feed capacity and attendant offsite facilities. Expansion is so designed that it can also process Bombay High Crude. The Project was approved by Government of India in December 1980 at an estimated cost of Rs. 65.85 crores including foreign exchange component of Rs. 10.35 crores. The estimate based on 1979 prices was revised (December 1981) to Rs. 150.36 crores (based on September 1981 prices) including foreign exchange component of Rs. 24.47 crores. No provision for escalation in future had been provided in the estimate. The revised estimate was approved by Government of India in June 1982.

5.10.2 The following table gives a comparison of the original with the revised estimates :—

(Rupees in lakhs)

	Original estimate based on 1979 cost	Revised estimate based on September 1981 cost	Increase
Onsite facilities	3124	7231	+4107
Offsite facilities	2167	4846	+2679
Royalty/basic engineering	92	94	+2
	5383	12171	+6788
Contingencies	254	1208	+954
Charges for engineering & project management	458	702	+244
	6095	14081	+7986
Preproduction interest	490	955	+465
TOTAL	6585	15036	+8451

5.10.3 The reasons for increase in cost and the extent of increase for each is given below :—

	Rs. in lakhs	Percentage of the increase
New items and changes in scope	1088	13
Change from indigenous to imports	579	7
Change during detailed engineering completed upto now	978	11
Project management	244	3
Price Escalation	2188	26
Under-estimation	987	12
Provision for possible changes in design etc. (net addition of 5% on committed items and 10% on remaining installed cost)	976	11
Contingency	954	11
Preproduction interest	465	6
	8451	100

5.10.4 The Planning Commission, which examined (February 1982) the revised cost estimates for submission to the Public Investment Board, felt that the methodology followed in the analysis of major factors for increase in cost appeared unsatisfactory as it relied on RBI index for wholesale prices for major imports and observed that it should have been possible for Engineers India Limited to build a specific index on petroleum plant and machinery. The Planning Commission also suggested that expenditure required upto 1st July 1982 may be allowed to be incurred and clearance of the revised cost estimate might await the report of the Sub-Group which was examining the entire methodology for preparation of feasibility report in Petroleum Sector.

5.10.5 The matter came up for consideration of the Public Investment Board in February 1982. The Adviser (Energy) to the Planning Commission observed that PIB did not have any method to check the cost estimates and depended essentially on Public Sector Undertakings and Ministries who, in turn depend on machinery available within their own organisation or on the consultants to present a reasonable feasibility report, including realistic cost. He also observed that when these estimates were prepared, the revised cost estimates to Koyali Refinery were available and it was not, therefore, clear as to why EIL did not take the data of Koyali Refinery while framing the estimates for the Refinery Expansion Project. Doubts were also expressed whether the original feasibility report was prepared with due care. The Secretary, Petroleum, mentioned that while he was unhappy about the substantial increase in cost estimates, he did not apprehend similar situation in future. He also observed that the Committee appointed under Adviser (PAD) to the Planning Commission would go into the methodology of cost estimates. The PIB approved the revised cost and desired that the report of the Committee set up by the Department of Petroleum under the leadership of Adviser, Planning Commission, Planning Appraisal Division (PAD), should be submitted quickly for consideration by PIB.

5.10.6 The Project is scheduled to be completed in December 1984. In view of the accelerated production programme of Bombay High Crude Oil, after discussion with the Ministry, the implementation of this project had been speeded up. Revised target of completion is October 1984 for catalytic cracker and March 1984 for other units. These have since been postponed to January 1985 and July 1984 respectively. Expenditure incurred upto 31st March 1983 was Rs. 55.51 crores out of the total estimated cost of Rs. 150.36 crores.

5.11 **Other Projects**

The following table indicates the other projects under implementation :—

Name of Project	Estimated cost (Rs. in crores)	Date of Approval by GOI/Management	Completion Schedule	Scope
(1)	(2)	(3)	(4)	(5)
(*i*) Crude Desalter, Bombay	0.85 revised to 1.60	April 1980 (Board)	April 1982 Revised to November 1983	Installation of desalting facilities at Fuel Refinery to handle high salt content in crude cargoes Facilities, when installed would help in improving heat recovery in crude pre-heat exchangers/. furnaces and also avoid crude throughput loss due to unscheduled shutdowns and reduce maintenance and repair cost for crude pre-heat exchanger/furnaces. The reasons for slippage were delay in finalising agreement and in ordering critical equipment.
				Expenditure incurred upto March 1983 is Rs. 144 lakhs.
(*ii*) Hexane Maximisation	5.61	October 1982 (GOI)	October 1985	The project envisages installation of additional facilities to increase hexane production, a raw material required for extraction of edible oil from 30,000 tonnes to 61,000 tonnes per annum at Bombay Refinery. Detailed engineering had been entrusted to a firm and the work is in progress.
(*iii*) Additional product tankage	10.01 revised to 11.28	March 1983 (GOI)	1984–85	To augment petroleum product storage. This project, so far as HPCL is concerned, is expected to provide cover of 45 days peak sales projected for 1985-86.
				The expenditure incurred upto March 1983 was Rs. 2.05 crores.

6. SALE OF PRODUCTS AND PRICING POLICY

6.1 **Organisation**

The HPCL has 15 Regional Offices, 17 main installations, 58 inland depots, 46 hospitality points, 9 Lube Depots, 2 contractor operated depots, 5 Taluka Kerosene Depots, 2 Aviation Service Centres, 19 LPG bottling and distribution centres, 5 auto care centres and 3,374 retail outlets as at the end of March 1983.

6.2 **Targets and Achievements**

6.2.1 Sales targets fixed by HPCL for different categories of petroleum products and the actual sale effected for the period 1976 to 1982-83 are given in Annexure IV.

6.2.2 The sales have been showing an upward trend consistent with the allocations of market by Government and availability of products. The volume of sales from 1977-78 onwards is on the basis of monthly sales plan allocation to HPCL by the Ministry, in consultation with the Oil Companies. The Sales Plan Target on the whole and that allotted to Companies are based on the projected demand and estimates of refinery production. According to the Company (May 1982), any increase or decrease in the product availability or change in the pattern of demand is to be shared by the Oil Companies in proportion to their original sales plan entitlements. Sales are much higher than HPCL's own production because of allocations from other refineries/imported products.

6.3 **Opening of Retail outlets**

6.3.1 Opening of new retail outlets are regulated by the guidelines issued by Government of India from time to time keeping in view the growing needs of urban/semi-urban areas, requirements of agriculturists in remote rural areas and the social objective to provide opportunities to weaker sections by reservations of prescribed percentage of dealerships for new outlets. The following tables show the number of retail outlets planned during 1980-81, 1981-82 and 1982—84 (Part I) and that opened to end of March 1983, which show considerable shortfalls.

	1980-81		1981-82		1982—84(I)	
	Planned	Actuals	Planned	Actuals	Planned	Actuals
1. *MS and HSD Outlets*						
Weaker sections and reserved categories	54	46	78	55	133	Nil
Others	41	39	38	33	21	Nil
	95	85	116	88	154	Nil
2. *Kerosene and LDO Distributors*						
Weaker sections and reserved categories	23	20	11	6	50	Nil
Others	17	17	7	7	20	Nil
	40	37	18	13	70	Nil
3. *LPG Distributors*						
Weaker sections and reserved categories	48	42	84	72	112	—
Others	25	24	48	42	45	—
	73	66	132	114	157	—

6.3.2 The number of Outlets located in the rural areas out of the total units noted above indicated planned during 1980-81, 1981-82 and 1982—84 (Part I) and that opened to the end of March 1983 are indicated below, which show heavy shortfalls.

	1980-81		1981-82		1982—84 (I)	
	Planned	Actuals	Planned	Actuals	Planned	Actuals
1. *MS and HSD Outlets*						
Total No. of units	95	85	116	88	154	Nil
Located in rural areas	79	70	100	81	145	Nil
2. *Kerosene and LDO Distributors*						
Total No. of units	40	37	18	13	70	Nil
Located in rural areas	21	20	10	8	62	Nil
3. *LPG Distributors*						
Total No. of units	73	66	132	114	157	—
Located in rural areas	—	—	—	—	—	—

6.4 **Service to Consumers**

6.4.1 The HPCL issued guidelines to all its retail outlets for maintaining quality of products, their sale in correct measures at established price, facilities for display of services to be made available by LPG distributors and for display of information for the benefit of consumers. Periodical inspection of retail outlets are undertaken by the officials of the Company to ensure that the customers services expected of dealers, are provided. Customers Service Cells have been established at Regional Offices and storage points to enable consumers to lodge their complaints and suggestions. This would show a very heavy dependence on instructions to dealers, the observance of which is checked by inspections, which can perforce, be only fractional. As it is, the consuming public is mostly ignorant of its rights, as the petroleum company leaves it to the dealers to display the facilities and services to be provided by them to the consumer. Consumer education by the Company would be more

beneficial, especially if it is extended to cover the risks involved in some of the present practices of the users of these products (*e.g.* sucking of petrol from clogged jets by drivers, which leads to lead poisoning) and the safety measures to be adopted by the users of LPG etc., these should be regarded as essential obligations to the consuming public from a nationalised petroleum industry. Unfortunately, even the objectives and obligations approved by the Government do not spell out such an obligation to the consuming Public who are generally left to the tender mercies of the dealers.

6.4.2 The Company stated (February 1984) that they and the petroleum industry are spending substantial amount to educate the public/consumers about the safety aspects of LPG through publicity in the T.V., AIR and newspapers.

6.5 **Check against Adulteration at Retail Outlets—**

The HPCL has a system of periodical surprise inspection by its staff as well as jointly with staff from other Oil Companies, to verify stocks and draw samples for laboratory tests etc. According to the Company (March 1983), steps would be taken to terminate the distributorship in proven cases of adulterations. 15 cases (2 in 1979-80, 4 in 1980-81, 3 in 1981-82 and 6 in 1982-83) of suspected adulteration were detected. Dealership was terminated in 2 cases of 1981-82. In the remaining cases, where supplies were suspended, the Company stated (March 1983) that supplies were resumed on the advice of district authorities in six cases and in 4 other cases, after establishing that the products were as per specification. The remaining 3 cases are under enquiry (December 1983).

6.6 **Promoting Ancillary Industries**

6.6.1 Promotion of ancillary industries is one of the objectives of the HPCL. The Company, however, stated (January 1983) that in refinery operations the scope for development of ancillary units, is limited on account of the following factors :

(i) Some of the items like catalysts and Chemicals, exchanges furnace tubes, and safety equipment are being imported, since overall consumption is not sufficient to support viable indigenous manufacturing unit.

(ii) It would be difficult to sustain ancillary units exclusively to cater to the needs of operating plants/equipment and maintenance spares which are not continuous and repetitive, besides being of a specialised technical nature, requiring precision and stringent quality requirement.

6.6.2 However, with 12 petroleum refineries with a total capacity of 37.80 MTPA in India and more on the anvil, this aspect of establishment of ancillary units needs re-consideration by the Government.

6.6.3 On the marketing side, for the requirement of containers for packing petroleum products, pressure vessel castings, flow meters, valves, LPG cylinders/ regulators etc., Capacity of a few indigenous manufacturers/fabricators in the field are utilised by Oil Industry and steps are stated to have been taken to develop new manufacturers to encourage small scale units to accelerate import substitution.

6.7 **Pricing Policy**

6.7.1 In March 1974, the Government of India set up an Oil Prices Committee (OPC) which was required to recommend general principles of pricing policy of petroleum products and other connected matters that would be practicable and flexible enough. The OPC submitted its interim report in January 1975 and Government of India's decision thereon in respect of fuel products was implemented, effective from 14th July 1975. Salient features of this decision were :

(i) For each fuel refinery, retention price was fixed for each petroleum product taking into account the average level of throughput, standard patern of production, landed cost of crude, refining cost, percentage of fuel and loss, return on net fixed assets at 10 per cent and return on working capital at 15 per cent.

(ii) The effect of excess or shortfall in throughput and variations in pattern of production as a result of Government directives were to be adjusted to pool accounts based on certain standard guidelines recommended by OPC.

Under recoveries on account of refinery deficiencies, breakdown etc. were to be absorbed by the refinery.

(iii) The refineries were entitled to incremental refining cost and return on working capital in respect of incremental throughput of refinery.

(iv) Ex-refinery prices were fixed on uniform basis. Difference between ex-refinery price billed by the refinery and the retention price was to be adjusted through an Oil Industry pool account.

(v) Refineries would be the pricing points and prices at upcountry depots or installations were to be determined on the basis of price at the nearest refinery plus cost of transportation by the cheapest mode of transport.

(vi) Marketing and distribution costs and 12 per cent return on capital employed were allowed for marketing companies.

6.7.2 On the final report of OPC of November 1976, Government of India decided to continue the scheme implemented from 14th July 1975 but with the following additions with effect from 16th December 1977 :

(i) Retention price concept was extended to Lube refineries also.

(ii) The rate of return on net fixed assets of refineries was increased from 10% to 15%

and the return on working capital was allowed on the higher crude price.

(iii) Return on capital employed for marketing companies was increased from 12 to 15 per cent.

6.7.3 The refineries are ompensated for the increased FOB cost of crude over the cost assumed in the retention price, from COPE account from 1975 and earlier. Additional compensation to Oil Companies towards refining and marketing cost escalation, over those fixed in 1975/1977, as detailed below were allowed by Government in March 1981/ May 1981 :

(i) Additional return on working capital from 1st June 1980.

(ii) Additional cost on salaries and wages due to long term settlements, effective 1st January 1978.

(iii) Escalation in cost of chemicals, catalysts etc. and utilities effective 1st January 1978.

(iv) Return on additions to net fixed assets and depreciation thereon from 1978-79 onwards and

(v) Filling charges for LPG/Bitumen based on new standards from January 1981.

6.7.4 In July 1982, Government revised the rfining cost retrospectively with effect from 1st April 1981. In respect of marketing operations, however, certain interim, *ad hoc* relief towards administration, installation etc. cost were allowed (July 1982) by Government with effect from 1st April 1982, pending advice of final marketing and distribution costs.

6.8 Claims on Account of variations in standard Pattern of production

6.8.1 In mid July 1975, GOI decided, on the basis of interim report (July 1975) and final report (December 1977) of OPC, that any favourable/ unfavourable effect in production pattern on account of variations due to GOI directive should be credited/ debited to Oil Industry pool account, provided that any unfavourable effect due to plant deficiency, operational effect or other factors was not to be reimbursed from pool account and favourable effect due to operational/managerial efficiency would accrue to the concerned refinery.

6.8.2 It was also indicated that detailed mechanism for these adjustments was under review by Government of India in consultation with Oil Industry and would be issued in due course.

6.8.3 Yearwise details of HPCL's claims and surrenders adjusted to the pool account on this account are shown below :—

Amount of claims/(surrenders)

Period	Fuel Refinery	Visakh Refinery	Lube Refinery
		(Rs. in lakhs)	
14-7-1975 to December 1975.	119.72	..	..
1976 . . .	119.24	..	..
1977–78 . . .	29.66	..	(12.41)
1978–79 . . .	(47.50)	29.46	(10.45)
1979–80 . . .	(1.14)	(15.53)	(21.82)
1980–81 . . .	287.50	(235.61)	(2.69)
1981–82 . . .	2042.17	(496.26)	(18.58)
1982–83 . . .	2031.38	(126.92)	(24.07)
TOTAL . .	4581.03	(844.86)	(90.02)

6.8.4 Detailed instructions have not, however, been issued so far (December 1983) and HPCL continued to adopt the standard production pattern which cannot be considered realistic on account of the changes in the types of crudes processed and the limitations in the storage and marketing of LSHS which is produced in large quantities while refining Bombay High Crude.

6.8.5 The Ministry replied (January 1984) as under :

"No detailed instructions have been issued because (the OCC feels that) it would be difficult to evolve instructions to suit every conceivable situation of various permutations and combinations of crude mix and product pattern. However, each case of change in crude mix and/or product pattern is examined on a case-by-case basis for working out adjustments from the Pool Accounts."

6.8.6 It is, however, observed that HPCL continued to claim production pattern variation on the basis of Standard production pattern recommended by OPC (July 1975/December 1977) and the case-by-case exercise referred to in the Ministry's reply does not seem to have been given effect to so far (January 1984). It would have been worthwhile for the Ministry to lay down standard production pattern for different types of crude processed by the refineries with reference to the characteristics of individual crude which could, then, be adopted by the Oil Companies for working out their claims on the Pool Accounts for variations in actual production due to Government directives in tune with Marketing requirements. This has not been done by the Ministry, so far with the result that there are no approved norms for checking the individual claims of the company and there is also resultant avoidable time-lag between the claims by the Company and the final settlement thereof by the O.C.C.

6.9 Claims on COPE account for products down-graded

6.9.1 Crude Oil price equalisation (COPE) mechanism, effective from 16th October 1973,

provides for compensating the oil companies for variations between cost of crude oil included in the pricing of petroleum products and actual cost. The refineries processing indigenous crude are required to surrender to COPE account, the difference between the actual cost of indigenous crude and that included in the refinery retention price. The quantity of crude oil for which such credits or debits to the COPE account is made, is determined by escalating the actual production of formula products, from month to month, by the fuel and loss percentage allowed for the refinery, under the standard pattern of production, which, does not, however, cover the changes in the fuel and loss due to changes in the crude mix actually used. When using Bombay High Crude in large quantities, as in Visakha Refinery, there is higher fuel consumption which will also vitiate these calculations.

6.9.2 The fuel refinery of HPCL downgraded in August 1974, a quantity of 21,000 barrels of HSD to FO for want of Ullage. A quantity of 30,000 barrels of ATF was downgraded in May 1975 to SKO since one of the ATF tanks did not meet freezing point specifications. These downgradations resulted in less realisation in product value.

6.9.3 HPCL was paid Rs. 6.17 lakhs from COPE towards the difference in product value obtained *vis-a-vis* the cost of crude oil on the basis of downgraded products.

6.9.4 The HPCL stated (July 1976) that "the Criterion of higher market value or sale price is not strictly relevant to the question of losses either to the Corporation or to the Ministry. Also one has to take into account the fact that in the normal scheme of operating a refinery continuously, there are bound to be occasions where an alternate product has to be produced though its sales value may be less..... .....".

6.9.5 While, under the scheme, compensation is allowed towards variations in cost of crude taking into account the normal pattern of production, the adjustment of losses arising out of product downgradations due to internal deficiencies in the working of the refinery, to COPE account is not justified.

6.9.6 Eventhough the HPCL stated (June 1976) that they have established a system by which a record of the reasons for downgradation if any, and action taken consequent to downgradation would be regularly maintained for review by the management and for use by Audit to ascertain whether or not the "loss" was avoidable, no such records were, however, produced to audit.

7. FINANCIAL POSITION AND WORKING RESULTS

7.1 Financial position

The table below summarises the financial position of HPC under broad headings for the years 1974 to 1982-83 :

(Rupees in lakhs)

	1974	1975	1976	(15 months) 1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
Liabilities									
(*a*) Paid-up Capital	1075.00	1000.00	1000.00	1000.00	1520.00	1520.00	1520.00	1520.00	1520.00
(*b*) Reserves and Surplus	2617.20	2631.10	2744.31	3252.45	6074.94	7054.19	8491.54	9718.72	11335.42
(*c*) Borrowings :									
(*i*) From Govt. of India	—	—	100.00	341.00	1013.33	957.23	1212.35	1102.46	992.57
(*ii*) From Bank :									
1. Overdraft (by pledge of Part of Fixed deposit or Secured by Hypothecation of Corporation's stock in trade)	107.88	—	382.80	261.52	353.12	5723.87	9232.44	9476.83	3427.99
2. Overdraft (unsecured)	3024.15	3739.77	—	—	—	—	—	—	—
3. Other loans (unsecured)	242.52	213.33	161.87	76.34	49.18	—	—	—	—
(*iii*) From others	217.48	167.98	2160.54	31.00	101.00	104.75	1593.79	1742.76	9796.00
(*iv*) Deposit received from customers	54.60	54.60	54.60	54.60	54.60	—	—	—	—
(*v*) From Public	—	—	—	—	—	—	737.21	1887.25	2660.68
(*d*) Trade dues and other liabilities (including provisions and interest accrued and due)	3530.70	3753.68	4325.50	7216.59	11938.37	17900.22	21216.14	22126.72	21676.93
	10869.53	11560.46	10929.62	12233.50	21104.54	33260.26	44003.47	47574.74	51409.59
Assets									
(*e*) Net Fixed Assets	3128.07	3028.94	2876.16	3241.21	5469.54	5800.74	6804.61	6992.70	9348.09
(*f*) Capital work in progress (including unallocated expn.)	51.57	114.89	277.21	189.37	769.65	1400.05	1952.08	5362.36	12316.76
(*g*) Current Assets, Loans & Advances	7688.02	8413.74	7773.52	8800.51	14860.20	26054.58	35241.93	35215.11	29701.50
(*h*) Investments	1.87	2.89	2.73	2.41	5.15	4.89	4.85	4.56	43.24
	10869.53	11560.46	10929.62	12233.50	21104.54	33260.26	44003.47	47574.74	51409.59
Capital employed	7299.87	7699.50	6331.85	4830.39	8512.09	14080.26	20868.36	20130.77	17431.95
Net worth	3692.20	3631.10	3744.31	4252.45	7594.94	8574.19	10011.54	11238.72	12855.42

NOTE : 1. Capital employed represents net fixed assets plus working capital (current assets, loans and advances less trade dues and current liabilities excluding, provision for gratuity and pension).

2. Net worth represents paid up capital plus reserves and surplus less intangible assets.

7.2 **Analysis of Profit (Refinery/Marketing Profit)**

7.2.1 The table below gives an analysis of profit on refining and marketing for the years 1977-78 to 1982-83.

(Rs. in lakhs)

	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
	(15 months)					
(*i*) *Refining profit :*						
(*a*) Bombay Refineries	372	717	698	940	1576	1145
(*b*) Visakh Refinery	*	180	28	186	278	222
TOTAL—Refining profit	372	897	726	1126	1854	1367
(*ii*) Marketing Profit	1126	1767	1887	2705	2620	3620
Profit before interest and tax	1498	2664	2613	3831	4474	4987
Prior period credits/debits	(71)	(179)	536	814	750	134
Interest (Corporate)	(137)	(50)	(432)	(1260)**	(2185)	(2460)
Profit before tax	1290	2435	2717	3385	3039	2661
Tax Provision	(547)	(1240)	(1349)	(1735)	(1599)	(831)
Profit after tax (as per Annual Report)	643	1195	1368	1650	1440	1830

*Caltex Oil Refining (India) Limited (CORIL) was merged with HPCL effective May, 1978.

**Net of interest credits on pool account debit balance (Rs. 276 lakhs).

NOTE : The marketing profit includes other profits (on sale of tyres, tubes and accessories profit/loss on sale of fixed assets, income by way of commission and hire charges and interest income on investments) for a net amount of Rs. 64 lakhs, Rs. 233 lakhs, Rs. 238 lakhs, Rs. 521 lakhs, Rs. 338 lakhs and Rs. 214 lakhs during 1977-78, 1978-79, 1979-80, 1980-81, 1981-82 and 1982-83 respectively.

7.2.2 At present, financial results exhibited in the annual accounts do not show operation-wise (*i.e.* refining and marketing) details separately, which aspect is under consideration of the Ministry.

7.2.3 The profit (before tax) of the refineries per tonne of crude throughput and the profit (before tax) of the marketing division per tonne of product sales for the years 1977-78 to 1982-83 are given below :—

	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
Bombay Refineries :						
Crude throughput including lube base stock feed (in lakh tonnes)	31.13	29.91	33.36	32.95	36.51	32.72
Profit per tonne of crude throughput (Rs.)	11.95	23.97	20.92	28.53	43.17	34.99
Visakh Refinery :						
Crude throughput (in lakh tonnes)	—	11.96	11.00	13.19	11.78	10.77
Profit per tonne crude throughput (Rs.)	—	15.05	2.55	14.10	23.60	20.61
Marketing Division						
Sales (in lakh tonnes)	40.44	49.19	55.08	57.82	59.50	62.58
Profit per tonne of sales (Rs.)	27.84	35.92	34.26	46.78	44.03	57.85

7.2.4 The above figures would show that the refinery profit per tonne of crude throughput is higher in Bombay refineries as compared to Visakh refinery and also that the marketing profit per tonne of sales is higher than the refinery profit per tonne of crude throughput.

7.3 **Working Results**

7.3.1 Working results for the years 1974 to 1982-83 are as under :—

(Rupees in lakhs)

Particulars	1974	1975	1976	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
(*i*) Profit before tax	582.81	232.03	804.34	1289.76	2435.38	2716.84	3385.19	3039.43	2660.67
(*ii*) Tax provision	375.54	163.58	487.09	646.62	1239.79	1349.02	1735.03	1599.46	831.17
(*iii*) Profit after tax	207.27	68.45	317.25	643.14	1195.59	1367.82	1650.16	1439.97	1829.50
Percentage of profit before tax to									
(*a*) Sales	1.56	0.50	1.52	1.81	2.82	2.46	2.15	1.54	1.21
(*b*) Gross fixed assets	11.99	4.60	15.57	21.99	24.82	24.37	25.58	20.44	13.81
(*c*) Capital employed	7.98	3.01	12.70	26.70	28.61	19.29	16.22	15.10	15.26
Percentage of profit after tax to :									
(*a*) Net worth	5.61	1.88	8.47	15.12	15.74	15.95	16.48	12.81	14.23
(*b*) Equity capital	20.72	6.84	31.73	64.31	78.65	89.98	108.56	94.73	120.36
(*c*) Capital employed	2.84	0.88	5.01	13.31	14.04	9.71	7.91	7.15	10.50
Total Sales (in thousand tonnes)	2567	2734	2872	4044	4918	5508	5782	5950	6258
Net profit (after tax) per tonne of goods sold (in Rs.)	8.07	2.50	11.05	15.90	24.31	24.83	28.54	24.20	29.23

7.3.2 The percentage of profit (after tax) to equity capital has increased over the years to a high figure of 120.36% in 1982-83. The percentage of profit after tax to net worth (*i.e.* equity capital plus free reserves) is very much less and has come down from 16.48% in 1981-82 to 14.23% in 1982-83, as equity capital base is kept far too small.

7.3.3 The reasons for variations in the net profit from year to year adduced by HPCL were as indicated below :—

(Rs. in lakhs)

	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
Factors contributing to higher profits						
Improvement in margin due to final OPC prices	186	641	—	103	1264	705
Sales higher than volume fixed by OPC	815	Not worked out	744	343	127	697
High margin on non-block Lubes/non-formula products	77	294	—	—	—	—
Tax effect on investment allowance	98	—	—	—	—	—
Recovery from Pool accounts towards additional costs	—	—	—	1578	213	347
Other reasons	—	—	198	304	194	—
Factors leading to reduction in profit						
Retrospective adjustments for LOBS/TOBS	105	—	—	—		
Higher income-tax	276	—		—		
Addl. Depreciation	—	241	—	91		
Higher Fuel & Loss/Stock loss	—	—	40	—	96	124
turn around effect	—	—	—	77		
lower crude run/other reasons	—	—	—	—	198	356

7.3.4 The rising trend in the profit per tonne of crude refined and that of product sold has been due to application of new pricing mechanism and improvement in margins due to final OPC prices, higher volume of sales and reimbursement of expenses incurred in the refinery and Marketing Divisions in excess of those included in the retention prices for major heads of expenses like utilities, long term settlement of employees wages and D.A. depreciation and return on additional working capital. In effect, as the Company is reimbursed their actual costs through the retention prices and the Pool accounts, the profit margin included in the retention prices netted higher profits on increased volume of transactions. Because of the method of compensation from the pool account on 'cost plus' basis, the Company's financial working results are not affected adversely by the higher operational costs. In other words, while the present system of administered prices affords total financial security for its operations to the Company evaluation of profits due to operational efficiency of the Company is not resorted to.

7.4 Effect of Non-revision of prices of Petroleum products inspite of steep increase in the price of Crude Oil

7.4.1 The prices of petroleum products were revised on 17th August 1979 and again on 8th June 1980. Between these dates, the price of imported crude increased from Rs. 1359.77 per MT (US $ 20.50/barrel) to Rs. 1942.56 (US $ 32.00/barrel). However, the pooled price of crude as well as prices of petroleum products were not revised in step with such increase in the price of imported crude. The delay in revision of prices led to deficits in the all India Oil Industry pool account, with the result that the pool could not settle the claims of oil companies for the increased price of crude paid for by them. Government, therefore, allowed the oil companies to resort to bank borrowings to tide over working capital deficits and agreed to reimburse interest charges on borrowings (upto the extent of the dues from pool account). HPCL, besides availing increased bank borrowings, resorted to a total short term loan of Rs. 6,000 lakhs from General Insurance Corporation of India, Life Insurance Corporation of India and Unit Trust of India between April 1980 and November 1981. The interest payment of Rs. 287 lakhs on these short term borrowings from banks and other institutions were reimbursed to the Company from Pool Accounts.

7.4.2 Regarding the non-revision of prices of Petroleum products between August 1979 and June 1980, the Ministry stated (January 1984) as under :—

> "Department of Petroleum has to consider increase in prices after consultation with various other Ministries and complete internal procedures for a decision. This has been so at each time price rise is decided, and the delay was not merely relating to period referred to". The delay in finalisation of decision of Government thus resulted in avoidable payment of interest charges (Rs. 287 lakhs) in respect of HPCL alone.

7.5 Claims under Incentive Scheme

Under the pricing scheme for petroleum products administered by Government of India, the retention price for each of the products was determined by the Government on a standard pattern of production. The retention price includes, besides cost of crude allocated to individual products, provision towards refining costs and margins calculated on net fixed assets and working capital requirements as recommend-

ed by OPC. The actual refinery fuel and loss has been allowed in the retention price subject to a limit fixed by Government of India for individual refineries as recommended by OPC in 1974. The refineries and marketing units thus operate within the parameters allowed under the pricing mechanism. Government of India stated (December 1982) that effective from 1st March 1977, they had approved, in principle, that the entire retention value for any improvement in the production pattern or reduction in fuel and loss achieved by a refinery through new investments or managerial efficiency, would accrue to the refinery on a yearly basis. The claims for Rs. 2951.65 lakhs submitted by HPCL under this scheme for the period from 1st November 1977 to 31st March 1982 are under review by Government of India in consultation with OCC and no final decision has been taken (December 1983). OCC have released an *ad hoc* payment of Rs. 200 lakhs only towards the claims upto 31st March 1980.

7.6 Pricing Scheme

7.6.1 In the nationalised oil industry, the raw material and its allocation as also the product output and the sales allocations are controlled by the Government. The present pricing scheme providing for reimbursement of crude oil cost, refining costs fixed on the basis of previous years, refinery fuel and loss based on historicals and fixed margins, (again based on historicals), provide very limited incentive for the refineries and marketing units to show improvement in performance, and hence scope for appraisal of their performance in audit is also limited.

7.6.2 This aspect as well as the long time taken in settling the claims of HPCL referred to in para 7.5 were brought to the attention of the Ministry on 12th January 1984 by the Audit Board with the suggestion that Government could devise a formula for determining the optimum output for the types of crude processed and the fuel and loss norms therefor for each refinery so that the oil companies could prefer their claims for better performance with reference to such norms. This would enable prompt settlement of claims of oil companies on account of improvement in the production pattern and reduction in fuel and loss, at periodic intervals and there would be no need for the Ministry/OCC to go into the details of individual claims from month to month which involve long delays. The Ministry agreed to consider the suggestion for issue of suitable instructions.

8. COSTING SYSTEM

8.1 The finished products of the refineries flow out of the crude oil processed in the distillation units and hence it is not possible to prepare accounts indicating the cost of each unit of the products. The international practice of joint costing is adopted by HPCL also.

8.2 Refinery costs

8.2.1 The ex-refinery price of products include an element of refining cost as recommended by OPC. The following table compares the refining cost per tonne as per OPC norms and the actuals during 1978-79 to 1982-83.

	Fuel Refinery, Bombay		Visakh Refinery		Lube Refinery	
	OPC Norms	Actuals	OPC Norms	Actuals	OPC Norms	Actuals
			(Rs. per tonne)			
1978–79.	19.77	27.29	21.81	28.60	208.29	285.42
1979–80.	19.77	30.48	21.81	38.36	208.29	305.42
1980–81.	19.77	37.53	21.81	44.57	208.29	440.56
1981–82.	45.11	38.27	52.36	69.69	344.90	540.96
1982–83.	45.11	57.55	52.36	82.21	344.90	779.10

8.2.2 The actual refinery costs have been higher than the OPC norms, fixed in December, 1977 on the basis of historicals, on account of escalation in costs of various elements over the years. Based on detailed representation of the industry, Government of India allowed the companies to claim from Pool Accounts, additional cost on long-term settlement with staff, chemicals and catalysts, utilities etc. with effect from January 1978 onwards, pending revision of refining cost norms. In July 1982, Government revised the refining cost norms retrospectively from 1st April 1981 based on the data furnished by the Oil Companies.

8.2.3 Since, however, the Company does not have any norms of or measurement of stream efficiency nor scientifically determined consumption norms for chemicals, catalysts and utilities as already brought out in earlier paragraphs the justification of the increase of costs per tonne over the norms fixed by OCC is not possible of being assessed.

8.3 Cost reduction efforts

8.3.1 HPCL indicated (October 1983) that they have been taking economy measures on a continuing basis at all levels of management and operations so as to control costs and reduce expenses by reviewing, periodically, performance as compared to budgets/targets and taking prompt corrective actions.

8.3.2 The Company stated (October 1983) that the following specific measures have been taken :

(a) *Marketing Division*

(i) *Stock loss.*—By intensive inspection of facilities, improved maintenance standards to reduce leakage/evaporation and tightening of controls, overall loss was reduced from 0.09% for the first 6 months of 1981-82 to 0.07% for the first 6 months of 1982-83, resulting in a saving of Rs. 72-21 lakhs in 1982-83 as compared to 1981-82.

(ii) *Own Delivery Expense.*—By monitoring and controlling through computerised programmes, pro-

ductivity and performance of Company's tank trucks have also been increased marginally in the first 6 months of 1982-83 as compared to 1981-82, achieving a saving of Rs. 18.63 lakhs in 1982-83 as compared to 1981-82.

(iii) *Marketing expenses.*—Norms have been established for painting and other expenses borne by the Company in respect of retail outlets. Multiplication of depot facilities involving large investments and recurring expenditure are being avoided by expanding hospitality arrangements with Indian Oil Corporation and Bharat Petroleum Corporation and integrating facilities so as to reduce duplication of facilities and operating costs. During 1982-83, arrangements for receiving and giving hospitality have been made in 5 locations each.

(b) *Refinery Division*

(i) *Fuel costs.*—Energy conservation cells have been formulated which continuously monitor and review the scope for savings through improvements and investments in capital projects.

(ii) *Operating costs.*—Close monitoring of direct cost related items such as chemicals/catalysts has reduced expenditure on catalysts and TEL. By installation of 525 KVAR rating capacitor banks, power factor at Visakh Refinery has been improved from 0.89 to 0.95, thereby reducing power consumption.

8.4 Pricing methodology based on fixed amount towards individual items of costs

8.4.1 In view of the continuous changes in the refining cost elements, especially with the additional refining capacity materialising on completion of on-going expansion schemes, there appears to be need for evolving standards of uniform prices for each petroleum product throughout the country, instead of its being different from State to State and even within the same taluka in a state.

8.4.2 The Ministry stated (January 1984) that "the issue of uniform prices is one of the terms of the oil cost Review Committee, whose report is awaited".

9. INVENTORY CONTROL

9.1.1 The value of closing stock of stores spares, chemicals etc. at the end of each year from 1975 to 1982-83, year-wise consumption (value) and the closing stock in terms of number of months' consumption are indicated in the Table below :—

	Stores, Spares and Chemicals			Asphalt Drum Sheet/Drums		
	Closing stock	Consumption	In terms of No. of months consumption	Closing stock	Consumption	In terms of No. of months consumption
1	2	3	4	5	6	7
	(Rs. in lakhs)			(Rs. in lakhs)		
Fuel Refinery						
1975 (T)	162.34	175.73	11.09	201.57	587.99	4.11
1976	166.81	156.01	12.83	118.38	740.69	1.92
1977-78 (T) (15 months prorated 12 months)	247.82	165.78	17.94	160.94	849.17	2.27
1978-79	193.77	151.99	15.10	103.04	853.58	4.26
1979-80	298.59	175.28	20.44	65.44	1161.70	0.68
1980-81 (T)	348.84	290.71	14.40	922.30	1007.99	10.98
1981-82	552.22	191.19	34.66	507.00	1120.20	5.43
1982-83 (T)	496.23	427.10	13.94	352.89	1242.43	3.41
Visakh Refinery						
1978-79 (T) (9-5-78 to 1-3-1979)	164.05	74.88	26.29	89.52	116.59	9.21
1979-80 (T)	253.70	83.38	36.51	194.25	115.30	20.22
1980-81	391.16	177.44	26.45	260.62	259.47	12.05
1981-82 (T)	461.56	231.67	23.91	131.36	202.44	7.79
1982-83 (T)	588.72	455.12	15.52	205.43	207.03	11.91
Lube Refinery						
1975 (T)	241.78	108.32	26.19			
1976	241.20	103.15	28.06			
1977-78 (T) (15 months prorated 12 months)	253.30	116.85	26.01			
1978-79	258.65	135.54	22.90			
1979-80	331.87	95.19	41.84			
1980-81 (T)	328.68	152.92	25.79			
1981-82	373.83	266.78	16.81			
1982-83 (T)	396.92	189.36	25.15			

(T) Indicates turnaround years

9.1.2 ABC analysis of inventory for other than process material is followed by the Fuel Refinery and Lube Refinery. Even though norms for closing stock in terms of months' consumption have been fixed as 12 months for spares and 6 months for stores other than maintenance, closing stock of stores, spares and chemicals held from year to year was heavy, both in Fuel Refinery and Lube Refinery. In the Fuel refineries at Bombay and Visakh and Lube refinery, stock of stores, spares and chemicals as at the end of March 1983 was Rs. 496.23 lakhs, Rs. 588.72 lakhs and Rs. 396.92 lakhs which represented nearly 14 months', 16 months' and 25 months' consumption respectively.

9.1.3 In regard to norms for closing stock, HPCL stated (July 1982)—"In the past, an inventory level of 6 months' for indigenous procurement and 12 months' for imported items was found to be satisfactory. Due to production problems, on account of power shortage and industrial relation problems etc. the supply time of the vendors extended, necessitating our warehouses to carry higher inventories. Even in respect of imported supplies, the lead time involving procurement has gone up. Based on current supply conditions, it was felt necessary to revise the norms to 8 to 10 months in respect of indigenous items and 18 to 20 months in respect to imported items".

9.1.4 It was stated (March 1983) that these norms were duly discussed/decided based on actual experience in the departmental weekly meetings chaired by the General Manager—Refinery.

9.2 Review of inventory by Task Force

9.2.1 With a view to bringing down excessive inventory to essential minimum level, keeping in mind the operating requirements, a task force was set up in September 1980 to make a critical review of warehouse inventory of Fuel Refinery and Lube Refinery. The task force was required to take steps for—

(a) disposal of slow moving/non-moving items;

(b) reviewing of commodities involved in excessive consumption including periodic review of stores house tickets at the Departmental Head Level; and

(c) updating the maxima and minima levels taking into account lead time for procurement of both indigenous and imported raw materials.

9.2.2 The Task Force met on four occasions between October 1980 and July 1981 and identified non-moving stores valued Rs. 195.29 lakhs. As a result of review by the Task Force, items valued at Rs. 2.97 lakhs, which could be used were deleted from the list of non-moving stores. A decision on the balance of items valued Rs. 192.32 lakhs is yet to be taken (December 1983) pending review/recommendation of Project Department/Maintenance Manager as indicated in the following Table :—

Action proposed by Task Force	Value of Non-moving stores	Steps taken/to be taken
	(Rs. in lakhs)	
(*i*) Deletion from list of non-moving stores subject to review		
Fuel Warehouse	5.10	As a result of review, stores valued Rs. 1.97 lakhs were to be deleted and balance to be referred to Project Department.
Lube Warehouse	13.02	To be referred to Project Department for their possible use.
(*ii*) Review of inventory of Aluminium Brass Tubes to explore use therefor.	1.00	To be retained for use in exchangers.
(*iii*) Circulation of list to user department		
C.S. Pipes	17.00	
Pipe Fittings	23.70	Maintenance Manager to review the list circulated and give his recommendations.
Valves	2.63	
Retractor/Insulators	6.25	
Tower Internals	8.00	
Insurance	36.82	
Stores for compressors/Pumps/Turbines	83.77	
	195.29	

9.3 Slow-moving and Non-moving Inventories

9.3.1 Agewise analysis prepared (March 1983) by Manager/Systems showed that, as at the end of March 1983, there were 3551 items valued at Rs. 100.78 lakhs in Fuel Refinery, Bombay and 4268 items valued at Rs. 147.77 lakhs in Lube Refinery that had not moved for period ranging from two to ten years as indicated below :—

(In lakhs of rupees)

	Items not moved during							
	24 to 60 months		60 to 120 months		120 months and above		Total	
	No.	Value	No.	Value	No.	Value	No.	Value
Fuel Refinery	1002	57.39	679	26.61	1870	16.78	3551	100.78
Lube Refinery	1559	58.62	1151	54.30	1558	34.84	4268	147.77

9.3.2 The stock as on March 1983, includes insurance spares worth Rs. 75.26 lakhs (2533 items) in Fuel Refinery and Rs. 127.76 lakhs (3220 items) in Lube Refinery. The value of surplus stores awaiting disposal *vis-a-vis* non-moving items, other than insurance spares, at the end of March 1983, was as under :—

	Surplus stores awaiting disposal		Non-moving items		% of Col. 2 to Col. 4
	No. of items	Value (Rs. in lakhs)	No. of items	Value (Rs. in lakhs)	
Fuel Refinery .	386	5.28	1018	25.52	20.68
Lube Refinery .	629	12.60	1048	20.01	62.97

9.3.3 HPCL stated (July 1982) "we cannot strictly go on the basis of movement analysis of one year period, as our Refinery turnaround comes every alternate year. Our experience indicates that some of the non-moving items which are not moving in non-turnaround year, will be required during the turnaround period. Hence we cannot take a hasty decision to dispose of all non-moving items since this may lead to a situation of our having to re-purchase the same items at much higher prices". It is worth mentioning that high inventory was obtained in turnaround years, also.

9.3.4 In Visakh Refinery, the system of ABC analysis of inventory is not in vogue. Maximum and minimum limit for stores and spares holdings have, however, been fixed. Taking into consideration the location of the refinery and lead time factor for acquiring stores, 9 to 12 months stock are ordered in respect of indigenous items and 18 to 24 months stock for imported items. As at the end of March 1983, there were 500 items of stores, spares and chemicals (valued at Rs. 7.01 lakhs) that have not moved for over two years.

10. OTHER TOPICS OF INTEREST

10.1 Siding/Shunting charges at Bombay

10.1.1 As per the pricing mechanism in vogue with effect from 16th December 1977, prices of bulk refined petroleum products in the Main Installation and up-country Depots were determined on the basis of prices at the nearest refinery point plus the cost of transportation (including siding and shunting charges ot wharfage) by the cheapest means (*i.e.* rail, coastal, barge or pipeline). Thus, the Oil Companies were authorised to recover through the selling prices, freight and siding/shunting charges incurred by them.

10.1.2 The element of freight including siding and shunting charges is higher by about Rs. 2 per kl. on an average for despatches from Sewree/Wadala over those applicable to ex-refinery, Trombay/Mahul as the industry had estimated in June 1978 that freight charges from ex-refinery Trombay/Mahul to Sewree/Wadala would be Rs. 2. For a number of years the Industry had been adopting the higher of the freight incurred by any of the Oil Companies at any location for recovery through selling prices. In June 1978, the Industry informed GOI jointly that for all rail despatches ex-Bombay, the cost incurred at the main Installations at Sewree/Wadala would be adopted for recovery through selling prices. GOI communicated (December 1979) acceptance of these rates with effect from 1st July 1978, Industry, thereafter, based prices ex-Sewree/Wadala and for all despatches to up-country depots freight including of siding and shunting charges was recovered as though they were despatched from Sewree/Wadala only.

10.1.3 On a review of the out of Zone rail movements of petroleum products of HPCL for the period 1st July 1978 to 31st March 1983 it was observed that a total quantity of 7.02 lakh MTs of asphalt and 12.48 lakhs kls. of other petroleum products were moved ex-refinery, at Mahul, recovering at ex-Sewree/Wadala points, thereby obtaining an unitended gain of freight charges from Mahul to Sewree/Wadala amounting to Rs. 39.00 lakhs @ Rs. 2 per MT/Kl. HPCL has not surrendered such over-recoveries to OCC, in the absence of definite instructions from GOI in this regard.

10.1.4 In this connection, HPCL stated (4th February 1981) :

> "Compared to an average Industry rate of Rs. 2 per kl. towards siding and shunting charges included in the price build up, an individual company may be incurring higher or lower expenses than the Industry rate. Such variation from the Industry rate are on Company's account and there is no Government directive for debiting or crediting the variations to the Government account."

10.1.5 As 85 to 90 per cent of the products are moved by HPCL ex-Refinery at Mahul, HPCL is not incurring even the average industry rate of Rs. 2 per kl. towards siding and shunting charges included in the price build up.

10.1.6 On the 2 cases mentioned above Government stated (January 1984) as under :—

> "The ex-storage point prices for all the petroleum products are fixed by Government at refinery locations. Form refineries to Depots, notional rail freight and other incidential costs are added to work out the prices. Government fixes prices at the main installations of the refineries and prices at other points are determined therefrom after adding the cost of transportation. The price at a depot town has to be uniform for all the Oil Companies. Companies may adopt different routes of supplies and sometimes even different sources. In this process, there can be under or over recoveries throughout the conutry and these generally even out. In the present pricing arrangement, it has neither been considered necessary nor feasible to keep an account of all such under/over recoveries; except in cases of out of zone movement."

10.1.7 The reply of Government does not justify the unintended gain to HPCL due to recovery of notional freight in the ex-storage point price at higher rates, for the sake of having uniform prices at the location. Though similar over-recoveries in the case of another Oil Company were credited to Pool Accounts, HPCL have retained them, without justification and this became possible only because of the lacunae in the existing procedure.

11. OVERALL SUMMARY

11.1 Introduction

11.1.1 With the permission of GOI, ESSO Eastern Inc. (ESSO) constructed an Oil Refinery called "ESSO Standard Refining Company of India Limited". (ESRC), at Bombay, in July 1954. (Para 1.1)

11.1.2 GOI and ESSO, each contributing 50% of the equity share capital, established a lube refinery called "Lube India Limited" (LIL) also at Bombay, in April 1966. (Para 1.2)

11.1.3 GOI purchased from ESSO 74% of Equity shares in ESRC and an additional 24% of equity shares in LIL in March 1964. (Para 1.3)

11.1.4 GOI also took over, by an Act of Parliament, the marketing undertakings in India of ESSO and vested it with ESRC in March 1974. (Para 1.4)

11.1.5 LIL was merged with ESRC in July 1974 and the merged company was renamed as "Hindustan Petroleum Corporation Limited (HPCL) in July 1974. (Para 1.5.1)

11.1.6 Government held 74% of the equity shares in HPCL and ESSO the remaining 26% of shares. In September 1976, GOI purchased the remaining 26% of equity shares from ESSO and from that time onwards HPCL became a fully owned Government Company. (Para 1.5.2)

11.1.7 In December 1976, GOI acquired, by an Act of Parliament, the Caltex Oil Refining (India) Limited (CORIL) at Visakhapatnam, as well as Caltex (India) Ltd., which was marketing the products of CORIL and merged the latter with the former. The merged Company (CORIL) was amalgamated with HPCL with effect from 9th May 1978. (Para 1.6).

11.1.8 GOI acquired the undertaking of Kosangas which was engaged in the bottling, transportation, marketing and distribution of LPG, effective from 26th May 1979 and vested it with HPCL. The owners of Kosangas have challenged the Acquisition Act in the High Court and a decision is awaited (December 1983). GOI also took over the management of Parel Investment and Trading Private Limited and Domestic Gas Private Limited which were also engaged in the business of bottling, transportation and distribution of LPG, with a view to nationalisation and appointed HPCL as the custodian of the two companies for purposes of Management, on behalf of GOI. These two companies have not yet been nationalised (December 1983) because the owners have challenged the takeover in Court. (Paras 1.7 and 1.8)

11.2 Capital Structure

11.2.1 The consideration paid for the purchase of shares in ESRC was much more than the book value of the shares acquired. Ministry have explained that the consideration paid was arrived at after detailed negotiations with the erstwhile owners. (Paras 2.1.1 to 2.1.3)

11.2.2 In the case of Kosangas Company, the liabilities exceeded the assets by Rs. 206.17 lakhs, without taking into account assets valued at Rs. 14.07 lakhs not handed over by the erstwhile owners to HPCL and other assets provisionally assessed at Rs. 163.87 lakhs, as against Rs. 0.10 lakh payable as per the Act. However, the issue of Acquisition is pending in Court (December 1983). (Para 2.1.5)

11.2.3 The authorised share capital of HPCL was Rs. 2075 lakhs (including 75 lakhs of preference shares) as against which, the paid-up equity capital, (all shares held by Government) as on 31st March 1983 was Rs. 1520 lakhs. Government have paid a further subscription of Rs. 2500 lakhs towards equity shares in May 1983. (Para 2.2.1)

11.2.4 In all GOI invested a total of Rs. 3879 lakhs in subscribing to and purchasing shares and acquiring the undertakings of Caltex and ESSO that were merged with HPCL upto May 1978. No part of this investment, by Government, was treated as a loan to HPCL. HPCL issued shares to Government for Rs. 1520 lakhs only as directed by the Government, against this investment of Rs. 3879 lakhs made by them. This resulted in Government not getting any return, by way of dividend on an investment of Rs. 2359 lakhs (Rs. 3879 lakhs minus Rs. 1520 lakhs), since 1974/1978. The total dividend of Rs 1,434.20 lakhs received by Government from 1974 to 1982-83, which works out to an average return of 13.20% per annum, on the actual share capital held by the Government yields a return of 4.74% per annum only on the total investment of Rs. 3879 lakhs made by the Government. The Government agreed (January 1984) to consider this aspect/desirability of issuance of bonus shares by HPCL in favour of Government. (Paras 2.3.1 and 2.3.2)

11.2.5 The debt-equity ratio of HPCL has risen from year to year since 1979-80 and has reached a high ratio of 6.61 : 1 as on 31st March 1983 as against the normal ratio of 2 : 1 for public sector undertakings, which is primarily, due to the pegging down of the equity base of the Company and assisted by the cost over runs of projects and high inventory. (Paras 2.4, 5.1 and 9)

11.3 Objectives and Achievements

11.3.1 The micro objectives (and obligation) of the HPCL were formulated by them in December 1980 but approved by the Government in December 1983. (Para 3.2.1)

11.3.2 Based on the general objectives, HPCL formulated (September 1981) a Corporate Plan covering the period 1980-81 to 1984-85. The objectives spelt out therein for Refineries and Marketing and the achievements thereof are examined in Paragraph 3.3.

11.4 Production Performance

11.4.1 The installed capacity of the fuel refinery at Bombay plus Visakh Refinery was 5.1 MTPA and that of the lube refinery 0.184 MTPA. Even though the HPCL has the design feed for each plant of the refinery, actual feed processed and the related output of each plant have not been monitored and reviewed. (Paras 4.1 and 4.2.1 to 4.2.5)

11.4.2 The shortfalls in crude throughput as compared to targets, attributable to unplanned plant shutdown and presence of water in the crude etc. would indicate the need for better upkeep of plant and elemination of water from the crude before feeding that into the distillation unit. (Paras 4.3.1 to 4.3.9)

11.4.3 Targets for crude throughput are fixed with an allowance of 10% of installed capacity to provide for various emergencies/contingencies. As the actuals are higher than targets in some cases, the Ministry agreed to consider reducing the allowance so as to ensure that the target poses a challenge for higher operational efficiency. (Paras 4.3.10 and 4.3.11)

11.4.4 Fuel and loss in the refineries have exceeded OPC norms in 1979-80 and 1982-83. (Paras 4.4.1 and 4.4.2)

11.4.5 No norms for input/output of individual major plants have been fixed. (Paras 4.5.2, 4.5.6 and 4.5.9)

11.4.6 In the case of Bombay, Visakh and Lube refineries, the down time as compared to targets/ available stream days was mainly on account of plant shut downs, including uplanned ones and lower demand for industrial oil in respect of lube refinery. (Paras 4.5.3, 4.5.4, 4.5.6, 4.5.7, 4.5.10 and 4.5.11)

11.4.7 HPCL has also not fixed norms for consumption of chemicals and utilities, the company made available (January 1983) some norms based on historicals. Norms on a scientific basis, are yet to be evolved. (Paras 4.6.1 to 4.7.2)

11.4.8. The energy conservation cell of the Company monitors the conservations measures through operating improvements and investment in capital projects, HPCL has executed capital projects costing Rs. 5.50 lakhs in fuel refinery and 51.07 lakhs in Visakh Refinery upto 1981-82, the estimated saving in fuel consumption on account of the capital projects was 4,659 tonnes in fuel refinery and 2,768 tonnes in Visakh Refinery. But the actual refinery fuel and loss showed an increase in 1982-83. The Company is now proposing to initiate action in the form of an overall refinery energy balance. (Paras 4.8.1 to 4.8.4)

11.4.9 *Research and Development* : Excepting the refinery laboratories, HPCL is not equipped to carry out any major Research and Development work. (Para 4.9)

11.5 Expansion and Modification Schemes

11.5.1 Time and cost over-runs are noticed in the execution of the projects. (Para 5.1)

11.5.2 Secondary processing facilities (vacuum pipestill and cat depot project) were installed at a cost of Rs. 463 lakhs and commissioned in January 1978 for improving the distillate yield. However, a pronounced increase in the distillate yield had been achieved before 1978-79 and there was only marginal improvement thereafter, which came down, in 1981-82 and 1982-83. (Paras 5.2.1 and 5.2.5)

11.5.3 The ATF pipeline from the refinery at Mahaul to Santa Cruz was commissioned in June 1981, as against the scheduled date of January 1980. But owing to delyed completion of storage tanks at Santa Cruz by IOC, a sister company functioning under the same Administrative Ministry, the pipeline could not carry the products to its full capacity till November 1981. The company had, therefore, to forego expected savings of more than Rs. 52 lakhs. (Paras 5.3.1 to 5.3.4)

11.5.4 The LPG Bottling plants constructed at Bombay, Bangalore and Nagpur are not being used to their full capacity, the main reason stated to be shortage of LPG. However, ONGC, under the same Administrative Ministry, is flaring away Bombay High Associated Gas on a large scale. (Paras 5.4.3 to 5.4.4)

11.5.5 Delay in the expansion of Lube Refinery necessitated import of HVI Lube base stocks to the extent expected to be produced by HPCL. Total import of HVI Lube base stocks by the country upto March 1983 were valued at Rs. 94.74 lakhs (Paras 5.5.1 to 5.5.4)

11.5.6 The original estimate of Rs. 6,585 lakhs (1979) of the Visakh Refinery expansion project has been revised to Rs. 15,036 lakhs (1981). The Public Investment Board has commented on the defective method of preparation of estimates in this case. (Paras 5.10.1 to 5.10.6)

11.6 Sale of Products and Pricing Policy

11.6.1 The Sales target and achievement are related to the supply plan allocations decided by GOI in consultation with the Oil Industry since 1977-78. Any increase or decrease in refinery production, product availability in the supply areas on account of limitations in transportation etc. have also to be shared. (Paras 6.2.1 and 6.2.2)

11.6.2 The HPCL has planned new retail outlets as per the guidelines isued by GOI from time to time keeping in view the growing urban/semi-urban areas. requirements of agriculturists in remote areas and social objective to provide opportunity to weaker sections. The number of retail outlets for MS/HSD. kerosene and LPG opened during 1980-81, 1981-82 and 1982-83 was, however, less than that planned (Paras 6.3.1 and 6.3.2)

11.6.3 Customer service cells have been established at Regional Offices and storage points to enable consumers to lodge their complaints and suggestions. (Para 6.4)

11.6.4 The selling prices of petroleum products have been regulated by GOI in the light of the recommendations of OPC which were accepted and implemented, effective July 1975. GOI has allowed retention prices which included specific elements and margin, both for refining and marketing. The rate of return on investment and working capital included in the retention price was 15% each. On account of escalation in the costs of refinery and marketing operations, GOI allowed (March 1981) the Company additional claims from the industry pool account to compensate for the increase in costs from January 1978. The refining cost was revised with effect from 1st April 1981, while interim, *ad hoc* relief is being allowed in respect of marketing costs, pending revisions of the norms. (Paras 6.7.1 to 6.7.4)

11.6.5 The GOI accepted the recommendation of OPC that any favourable/unfavourable effect on the standard pattern of production due to GOI direction would be adjustable to the industry pool account and those arising on account of company's initiative or deficiency would accrue to the company. HPCL makes adjustment to the pool account based on the standard pattern of production as determined by OPC in 1974, which can no longer be considered realistic on account of changes in the type of crudes processed and the limitations in storage and marketing of LSHS, which is produced in large quantities, while refining Bombay High Crude in Visakh Refinery (Paras 6.8.1 to 6.8.6)

11.6.6 The crude oil price equilisation mechanism envisages reimbursements of extra cost of crude actually used, computed on the basis of actual production of products as escalated by fuel and loss provided in the standard pattern of production for each refinery. However, this will not cover changes in the fuel and loss due to changes in the crude mix actually used. These calculations are likely to be vitiated when using Bombay High Crude involving higher fuel consumption, in large quantities. (Para 6.9.1)

11.6.7 Though COPE mechanism does not envisage reimbursement of difference in value of products due to operational defects, HPCL made a claim and got a payment of Rs. 6.17 lakhs from COPE on the basis of 21,000 barrels of HSD downgraded to FO in August 1974 for want of ullage and 30,000 barrels of ATF downgraded to SKO due to failure to meet specifications. (Paras 6.9.2 to 6.9.6)

11.7 Financial Position and working results

11.7.1 The working results of the HPCL for the years 1977-78 to 1982-83 showed profits of Rs. 643 lakhs, Rs. 1,195 lakhs, Rs. 1,368 lakhs, Rs 1,650 lakhs, Rs. 1,440 lakhs and Rs. 1,830 lakhs for the respective years. In addition to the margins allowed in the retention prices of HPCL (refinery and marketing) HPCL earned income by way of sales of tyres, tubes and accessories, commission, hire charges and interest income on investments. (Paras 7.2.1)

11.7.2 The refinery profit per tonne of crude throughput is higher in Bombay Refinery as compared to Visakha Refinery. Also the marketing profit per tonne of sales is higher than the refinery profit per tonne of crude throughput. (Paras 7.2.3 and 7.2.4)

11.7.3 The percentage of profit (after tax) to equity has increased over the years to a high figure of 120.38% in 1982-83. The percentage of profit (after tax) to net worth (*i.e.*, paid-up capital plus free reserves) was at 14.23% in 1982-83. (Paras 7.3.1 and 7.3.2)

11.7.4 Delay in the revision of pricing of petroleum products between August 1979 and June 1980, when the crude prices increased steeply, led to deficits in the Oil Industry Pool Account, with the result that Pool Account could not reimburse the claims of the Oil Companies, Government, therefore, allowed the Oil Companies to borrow, temporarily, from banks and other financial institutions to tide over working capital deficits and reimbursed, from pool Account, the interest charges on such borrowings. Such interest charges reimbursed to HPCL alone amounted to Rs. 287 lakhs. (Paras 7.4.1 and 7.4.2)

11.7.5 The purchase of crude, the allocation of the imported as well as indigenous crude to each refinery, from time to time, and the pattern of products required are regulated by the Government. The only sphere in which the individual companies can demonstrate their efficiency in their operations and sales. In the operations, the failure to review the permitted percentage of fuel and loss for each refinery, keeping in mind the different crude mix made available from time to time; and the refining cost and other elements of operation and sales overheads, which have been escalating over the years, had lead to the Companies operating on a cost-plus basis with little scope for incentives to higher efficiency. (Para 7.6.1)

11.7.6 Ministry agreed, at the Audit Board Meeting held on 12th January 1984, to consider fixing standard pattern of production for each type of crude processed and the fuel and loss norms thereof for each refinery. (Para 7.6.2)

11.8 Costing System

11.8.1 In petroleum refining, product-wise costing is not done and the international practice is to do pricing on joint cost basis only. HPCL also has adopted this practice. (Para 8.1)

11.8.2 The ex-refinery retention price included an element of refining cost as recommended by OPC. A review of actual refining costs from 1978-79 onwards, showed that they were higher than the OPC norms upto 1982-83. The GOI allowed the oil companies additional claims from January 1978 onwards and increased (July 1982) the element of refining cost in ex-refinery prices retrospectively from 1st April 1981 onwards, which enabled the company to make up for the under-recovery of refining costs. In the absence of scientifically determined norms for chemicals, catalysts and utilities, the economics of costs over OCC norms is not verifiable. (Para 8.2.1 to 8.2.3)

11.8.3 HPCL indicated (October 1983) that certain cost reduction measures have been taken by them in respect of stock losses, own delivery expenses and marketing and refining expenses. (Para 8.3)

11.8.4 In view of continuous changes in the refining cost elements, specially, with the additional refining capacity materialising on completion of on-going expansion projects, there is a need to evolve standards which would apply to changing circumstances, instead of specifying fixed amount for each refinery, as hitherto. GOI stated (January 1984) that the issue of uniform prices is one of the terms of the Oil Cost Review Committee whose report is awaited by then. (Paras 8.4.1 and 8.4.2)

11.9 **Inventory Control**

11.9.1 The stock of stores, spares and chemicals as on 31st March 1983 was heavy. (Paras 9.1.1 to 9.1.2)

11.9.2 HPCL set up a task force in September 1980 to review the inventory level. The task force identified non-moving stores valued at Rs. 192.32 lakhs. Decision on disposal of the stores so identified has not been taken by HPCL (December 1983). (Paras 9.2.1 and 9.2.2)

11.9.3 Age-wise analysis of stores and spares held as on 31st March 1983 showed that stores valued at Rs. 255.56 lakhs were not moving for 2 to 10 years. (Paras 9.3.1 and 9.3.4)

M. Prem Kumar

(M. PREM KUMAR)
Chairman, Audit Board and Ex-officio
Additional Deputy Comptroller
and Auditor General
(Commercial)

New Delhi,
The 5th Feb, 1984.

Countersigned

T. N. Chaturvedi

(T. N. CHATURVEDI)
Comptroller and Auditor General of India

New Delhi,
The 5th Feb, 1984.

ANNEXURE I

(Referred to in paragraph 4.6.3. of the appraisal)

Quantity = Q In tonnes/
Value = V In '000 Rupees

Fuel Refinery Year		OLEUM			CAUSTIC			TEL			CHLORINE			CATALYST		
		Budget Norm	Actual	Excess	Budget Norm	Actual	Excess	Budget Norm	Actual	Excess	Budget Norm	Actual	Excess	Budget Norm	Actual	Excess
1975	Q	675	881	206	404	537	133	4.1	16.5	12.4	174	216	42	144	320.4	180.4
	V	485	705	165	642	1170	290	27	127	95	125	169	33	1583	2518	1400
1976	Q	620	1147	527	311	690	379	2	36.8	34.8	220	268	48	346	747.6	401.6
	V	513	918	422	738	1485	816	18	263	249	204	213	38	3520	7127	3829
1977–78	Q	1509	1046	—	752	650	—	73.9	32.7	—	250	254	4	481	476	—
	V	1132	787	—	1571	1396	—	581	259	—	200	139	2	3490	3257	—
(15 months prorated to 12 months)																
1978–79	Q	1309	1132	—	779	612	—	13.6	5.7	—	295	288	—	545	513	
	V	1047	945	—	1558	1424	—	94	39	—	155	161	—	2620	2827	
1979–80	Q	1113	1331	218	734	571	—	2.9	0.5	—	292	262	—	520	640	120
	V	1035	1403	230	1909	2001	—	20	4	—	153	156	—	4433	4109	770
1980–81	Q	1028	796	—	521	458	—	2.5	—	—	292	152	—	508	737	229
	V	1439	1087	—	1958	1953	—	17	—	—	234	144	—	8577	6140	1908
1981–82	Q	428	1435	1007	518	716	198	2.7	5.5	2.8	242	222	—	670	987	317
	V	641	2022	1381	2370	3779	1409	73	82	9	340	178	—	5751	9983	4232
1982–83	Q	1124	1209	85	589	764	175	5.4	33.5	28.06	242	180	—	650	1124	474
	V	1685	1521	—	3238	3911	673	81.5	749.4	667.9	194	137	—	9737	10707	970

ANNEXURE — II

(Referred to in paragraph 4.6.3 of the Appraisal).

Visakh Refinery

Q — Quantity
V — Value
(In tonnes/in '000 Rupees)

Year		TEL			Catalyst			Sulphuric acid			Other chemicals (Caustic soda)*		
		Budget	Actual	Excess	Budget	Actual	Excess	Budget	Actual	Excess	Budget	Actual	Excess
1978-79	Q	8.9	0.47	..	143.5	147.387	3.887	105.500	39.155	..	290.520	172.196	..
(9-5-78 to 31-3-79)	V	161.26	8.45	..	1508.15	1725.15	45.50	68.58	20.50	..	847.11	701.35	
1979-80	Q	5.520	3.337	..	207.500	228.966	21.466	120.3	..	..	322.53	235.958	
	V	100	59.99	..	2654.1	2130.91	199.78	78.2	..	..	898.2	1029.86	
1980-81	Q	1.0	28.796	27.796	235.5	555.977	320.77	..	12.165	12.165	266.386	184.438	
	V	18.0	499.19	481.85	2670.6	6876.88	3963.98	..	5.84	5.84	1424.60	627.83	
1981-82	Q	25.0	11.976	..	531.2	300.463	..	..	10.523	..	292.091	423.398	131.307
	V	1091.25	358.87	..	8955.72	3912.72	..	..	5.05	..	1990.22	1921.01	
1982-83	Q	0.90	24.48	23.58	330.00	296.28	..	..	..	..	809.76	1093.60	283.90
	V	44.74	1154.00	1109.26	5771.70	4032.00	..	..	..	..	3010.39	3729.00	718.61

*Dye, Dye Orange/Red, Liquid Chlorine, Gasoline Inhibitor, Ammonia and others.

ANNEXURE III

(Referred to in Paragraph 4.7.2 of the Report)

(*a*) *Fuel Refinery*, Bombay

Units : Crude—'000 tonnes
Electricity—'000 kwh
Water—'000 kl

Year	Total crude throughput	Electricity	Water	Per tonne consumption	
				Electricity	Water
1975.	2824.1	58,620	660	20.76	0.23
1976.	2993.6	62,800	799	20.98	0.27
1977-78	3055.0	62,160	857	20.35	0.28
(15 months pro-rated to 12 months)					
1978-79	2923.5	67,756	913	23.18	0.31
1979-80	3214.2	74,571	942	23.20	0.29
1980-81	3189.9	76,764	822	24.06	0.26
1981-82	3601.8	83,314	864	23.13	0.24
1982-83	3124.6	72,259	815	23.12	0.26

(*b*) *Visakh Refinery*

Units : Crude—'000 tonnes
Electricity—'000 kwh
Water—'000 kl

Year	Total crude throughput	Electricity	Water	Per tonne consumption	
				Electricity	Water
1978-79	1195.8	18,391	530	15.37	0.44
(9-5-78 to 31-3-79)					
1979-80	1099.6	18,178	624	16.53	0.56
1980-81	1318.8	20,470	680	15.52	0.51
1981-82	1177.6	21,724	640	18.45	0.54
1982-83	1077.3	21,457	630	19.92	0.58

(*c*) *Lube Refinery*

Units : Reduced crude throughput—'000 tonnes
Electricity—'000 kwh
Water—'000 kl

Year	Reduced crude throughput	Electricity	Water	Per tonne consumption	
				Electricity	Water
1975.	204.3	45,500	385	222.71	1.88
1976.	221.4	50,125	401	226.40	1.81
1977-78	217.6	46,382	430	213.15	1.98
(15 months pro-rated to 12 months)					
1978-79	240.2	46,028	443	191.62	1.84
1979-80	253.4	51,204	433	202.07	1.71
1980-81	224.6	42,916	436	191.08	1.94
1981-82	207.4	49,783	457	240.03	2.20
1982-83	182.6	36,832	412	201.70	2.26

ANNEXURE

(*Referred to in para* 6.2.1.

Sales Targets (B.E. = Quantity in '000 tonnes) and Actual (Q = Quantity in '000 tonnes

Sl. No.	Product	1976			1977-78			1978-79		
		B.E.	Actuals		B.E.	Actuals		B.E.	Actuals	
			Q	V		Q	V		Q	V
1.	Bulk Petroleum Products	2653	2626	41121.67	3633	3768	57961.51	4495	4672	73402.18
2.	LOBS including (TOBS)	46	68	1418.41	64	89	1893.30	65	87	2474.07
3.	Carbon black feed stock	25	37	300.69	56	40	368.46	30	30	279.22
4.	Axle Oil	9	9	563.70	4	6	382.02	4	5	365.95
5.	Lubricating Oils	84	126	8744.60	96	135	9732.07	80	119	9114.00
6.	Textile auxillaries	—	—	30.82	—	—	29.79	—	—	24.07
7.	Hydraulic Brake Fluid	1	1	95.42	1	1	152.27	1	1	110.34
8.	Insecticides	1	1	122.17	2	2	168.30	1	1	99.02
9.	Greases	3	4	405.32	2	3	302.37	2	3	232.83
10.	Automotive Accessories	—	—	128.08	—	—	132.05	—	—	146.79
11.	Others	—	—	13.56	—	—	18.97	—	—	15.07
	GRAND TOTAL	2822	2872	52944.44	3858	4044	71141.11	4678	4918	86263.54
	Percentage of Actual Sales to B.E.		101.77			104.82			105.13	

NOTES : (*i*) 1978-79 figures include erstwhile CORIL's effective 9-5-1978.

(*ii*) 1979-80 figures include erstwhile Kosangas's effective 26-5-1979.

(*iii*) Details of Bulk petroleum products have not been made available by HPC.

IV

of the Report)

and V=Value in Rupees in lakhs)

1979-80			1980-81			1981-82			1982-83		
B.E.	Actuals		B.E.	Actuals		B.E.	Actuals		B.E.	Actuals	
	Q	V		Q	V		Q	V		Q	V
5297	5256	96852.00	5798	5502	139809.97	5770	5700	179296.07	6100	6001	199236.92
64	85	2692.24	64	78	3090.58	25	89	3697.80	*	51	2490.14
52	38	460.89	54	64	1263.72	56.5	31	760.53	49	66	1721.33
6	4	266.05	6	6	454.40	5	4	381.43	5	4	333.29
92	122	9543.54	101	125	11654.85	135	120	12498.81	167*	127	13900.71
—	—	11.20	—	—	10.85	—	—	7.47	—	—	10.73
—	—	85.30	1	1	176.57	1	—	168.10	1	1	264.73
2	1	133.48	2	1	181.74	1.5	1	180.76	1	1	195.98
1	2	167.33	4	5	536.76	5	5	593.44	7	7	759.29
—	—	140.12	—	—	190.90	—	—	214.78	—	—	205.97
—	—	14.55	—	—	12.85	—	—	13.54	—	—	24.75
5514	5508	110366.70	6030	5782	157383.19	5999	5950	197812.73	6330	6258	219043.84
	99.89			95.89			99.19			98.86	

(*B.E. for item 5 includes item 2 also 98.86.)

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